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Incorporating Food Industries Weekly

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FOOD MANUFACTURE

Vol. XXV. No. 3 · Published Monthly · March 1, 1950

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FOOD MANUFACTURE

Vol. XXV, No. 3 March 1, 1950

Agene

THE wide publicity accorded to it in the national Press would seem to suggest that the report recently issued by the Medical Research Council deals solely with the presence in flour of a dangerous substance known as agene, whereas it deals with the work of the Council over a period of three years, its topics ranging from deaf aids to human glue for skin-grafting.

For the past thirty years, so-called flour "improvers" have been in use in the milling industry in Great Britain. The earliest of these was ammonium persulphate, which was very widely used, but this compound, although exerting a beneficial effect upon the baking quality, had no effect upon colour, and flour was, therefore, bleached by an independent process.

Later it was discovered in America that nitrogen trichloride both "improved" the flour and bleached it. The advantages of this compound, marketed under the name of agene, were so appreciated that it gradually ousted the other "improvers," until today 90 per cent. of the British mills use it.

During his studies on rickets and other problems Sir Edward Mellanby noticed signs of hysteria among the dogs he used. He traced the trouble to the flour used in the making of the biscuits fed to the dogs, and eventually proved that the responsible agent was the nitrogen trichloride with which the flour had been treated, his findings being confirmed by a number of other workers. The questions then arose as to whether the consumption by human beings of flour similarly treated could have any harmful effects and whether other flour "improvers" in use had the same effect on dogs.

Energetic action was taken in Great Britain and in America in the investigation of these points. It was soon revealed that agene-treated flour would cause hysteria not only in dogs, but also in ferrets, rabbits, and cats, but that no ill-effects were caused when it was fed to rats, guinea-pigs, and hens. It also became established that persulphate, bromate, chlorine, and chlorine dioxide, the other "improvers" in general use, had no ill-effects, even on dogs.

At this stage, therefore, the position was that all flour "improvers" with the exception of agene had a clean bill of health, and that the only detrimental effect of the latter was the production of hysteria-like symptoms in some animals. In view of the fact that agene adversely affected only certain animals and that for many years it had been incorporated in most of the flours consumed in Great Britain and America, it seemed unlikely that the consumption of agene-treated flour was harmful to human beings.

In the report of the Medical Research Council it is stated to be conceivable that the consumption of agene-treated flour may have been a factor in the increased prevalence in recent years of certain chronic illnesses such as affections of the alimentary tract, but this argument requires further investigation, especially in view of the fact that an increased incidence of such ailments has been recorded in countries where all forms of flour treatment are prohibited.

A number of tests have been carried out upon normal human beings and upon those with a known tendency to epilepsy. Despite the fact that the test subjects have been fed with very much larger quantities of agene-treated flour than are ever consumed under normal circumstances, no evidence whatsoever that harmful results have accrued has been obtained.

Up to the year 1946 no direct human feeding trials with agene had been carried out; however, there was a definite feeling among certain eminent nutritionists and cerealists in the United States that, unless it could be proved correct beyond any shadow of doubt that agene had no harmful effects upon human beings, it should be regarded as a possible hazard and therefore not used. This attitude was fairly general in some sections of the American milling industry, and it was more or less at the wish of trade interests that the U.S. Food and Drug Administration arranged hearings to discuss the prohibition of the use of agene and its replacement by chlorine dioxide. In other words, the decision to

discontinue the use of agene in America was arrived at not because the authorities were satisfied that it was harmful to human beings, but because they were prompted to such a course by trade interests. As a result of these hearings, the use of agene was prohibited after August 1, 1949, and chlorine dioxide was put on the list of permitted additions.

While keeping an eye on the situation, the British authorities did not take similar steps, neither did the milling industry take the view adopted by their American counterparts. They were satisfied to continue with agene in view of the lack of evidence that such a practice was undesirable. They did, however, intimate to the Ministry that, should the authorities wish for any reason to follow in line later with the Americans, they would be prepared to co-operate and change to chlorine dioxide.

One reason for the recent decision to prohibit the use of agene in Great Britain is doubtless the publication of the Medical Research Council's report and the underlying suggestion that it is thus suspect. In this connexion it must be remembered that the report refers only to work carried out up to 1948, while much of the evidence provided by feeding tests with human beings was obtained in 1949.

Clean Wrapping Paper—Cleaner Food

Ministry of Health records show a marked increase in food poisoning over the last few years. In 1945 the numbers, not of isolated cases but of outbreaks officially notified, were 422; in 1946 they had risen to 598, and in 1947 to 765. The figures for 1948 are not yet available. Improved supplies of wrapping paper for food will, it is hoped, help to lessen the risks of food poisoning this year.

An official of the Board of Trade Paper Control said recently that ample stocks of wrapping paper are now available in all branches of the food trade, and there is no excuse for refusals to wrap bread and other foodstuffs, or for using soiled, previously used paper.

In the campaign for cleaner food which they are carrying on in co-operation with the Ministry of Health, the Ministry of Food are stressing the importance of fresh, unsoiled wrapping paper in preventing the contamination of food. The series of model by-laws which they issued last autumn to all local authorities with the request that they should adopt them in their own areas contains a clause prohibiting the use of any paper that is not clean for wrapping food. A large number of local authorities in all parts of the country have indicated that they intend to adopt these by-laws as soon as the necessary formalities have been completed.

According to Mr. A. A. Nelson, assistant secretary of the National Federation of Meat Traders' Associations, the meat trade is making a determined effort to improve the standard of cleanliness in the handling and delivery of meat. Greaseproof and other types of paper are now in full supply, and all butchers of good repute are using clean wrapping paper.

Tank Culture of Mushrooms

An interesting and potentially important outcome of American research is a mushroom product made by applying the tank culture methods used for penicillin production to the spawn of edible fungi. Dr. Szuecs, a scientist from Hungary now working at the Boyce-Thompson Institute, and Dr. Humfeld of the U.S. Department of Agriculture's laboratory at Albany, California, are both reported to be nearing the stage when commercial adoption is possible. At least one factory, in Iowa, is known to be utilising the U.S.D.A. process on a semi-industrial scale.

The basic principle is the large-scale growth of mycelium filaments by inoculating tanks of aerated and agitated nutrient solutions with selected strains of mushroom spawn. Only certain strains have been found to be suited to this method of culture. The nutrient medium can be a cheap natural waste, *e.g.* asparagus butt juice or rice bran extract, or it can be a synthetic solution of mixed chemical substances providing carbohydrates and nitrogen.

It is said that the U.S.D.A. products are creamy materials which may be frozen or canned. Dr. Szuecs's product has been developed as a solid composed of fine granular particles. However, for both products the major factor seems to be control of flavour, and the study of flavour-influencing conditions has been the chief aspect of research so far. Flavour is dependent not only upon the strain initially used; the nutrient medium, unless it is entirely synthetic, also has a significant effect. The early harvests of mycelium from the tanks are tasteless and the full flavour is not developed until a stage of full growth has been reached. Strength of flavour can be controlled, therefore, by timing the removal of the material.

Commercial interest is largely focused upon the use of these products as supplementary materials for mushroom soup stocks, mushroom sauces, and any other food product in which a mushroom flavour would be advantageous. The tasteless products

may also find a demand as vitamin B supplements, their actual lack of flavour giving them an advantage over yeast products, whose strong taste is objectionable to many people. It is claimed that the content of thiamine, riboflavin, and nicotinic acid in the mycelium products is much the same as that of baker's yeast or mushrooms grown in normal ways. Yields, incidentally, are of the same order as baker's yeast if the culture is not too rapid.

In a country as well lardered as America it is natural for specialised products to be the target of practical research. Conversion of food wastes or simple chemical substances into high-grade flavour or vitamin "concentrates" has economic possibility as a process of up-grading refinement; but it should not be forgotten that under more stringent food conditions these processes could, like the *torula* yeast process, convert abundances of carbohydrate into supplies of protein. The industrial application of microbiological methods is still in the perambulator stage. When it begins to walk it may have profound effects upon food production.

Kippers for Americans

As a result of his recent 15,000-mile tour in America, Sir Frederick Bell, chairman of the Herring Industry Board, has reached the conclusion that, by selling kippers and other herring products to the Americans, Great Britain could considerably increase dollar earnings.

Sir Frederick found that, although kippers were on sale in every city he visited, a great proportion of the American public had never eaten a kipper and did not know what it was.

A significant pointer to the prospects for Scottish kippers was the fact that kippers on sale in America, although mostly produced there, were invariably labelled with names suggesting Scottish origin. Many of the wrappers were overprinted with tartan designs and with such words as "Scotch Cure."

Provided the highest standards of quality were maintained, well-planned publicity effected, deliveries promptly and regularly made, prices made competitive, and the product packaged attractively, the prospects should be excellent.

According to Sir Frederick, it is expected that the Board will be able to make arrangements for kippers of the high quality required to be produced by the industry; the facilities provided by the Export Credits Guarantee Department should make it possible to carry out a complete research scheme and to place at strategic centres the stocks which will be needed to meet the demand which is expected to follow the initial sales drive.

Smells

From time to time smells—special ones, not the ubiquitous varieties—come into the news. Some years ago there was proposed a scheme for organ recitals to be given to the accompaniment of chromatic fantasies on a screen, the while a selection of exotic perfumes was sprayed into the air in consonance with the varying themes of the music. A similar thing has been proposed for changing "movies" to "smellies"; the implications (which need not be detailed here) are not wholly attractive.

The printed word is the next thing to be aromatised. We hear that in America the pages of a botanical magazine, on being opened, exude the fragrant scent of conifers, owing to the admixture of the appropriate scent with the printer's ink.

This idea would not be universally pleasing—there are magazines which treat, for example, of fish and fertilisers!

The foregoing leads naturally to the idea of the impregnation of the labels of food packages with the essences appropriate to their contents. At first this notion seems excellent; it has, in fact, been tried out in America, but the atmosphere of a food store with its heterogeneous array of goods from kippers to ketchup is probably better imagined than experienced.

We fear that our jaded senses will have to find some stimuli other than "smellies" and perfumed literature.

Fertilisers and Food

"Most people agree that the surest, quickest, and cheapest way to step up food production is by a more widespread and more liberal use of fertilisers. It would be a pity, therefore, if growers . . . seeking ways of cutting expenditure still further, were tempted to let the axe fall on the goose that lays the golden eggs." That is how a recent item released by the Ministry of Agriculture begins. But if there is any chance of this goose being axed it is due to the Ministry's own 1949 announcement that fertilisers are to be de-subsidised in two stages in 1950 and 1951. With feedingstuffs also de-subsidised, farmers are naturally looking anxiously at their production costs, for they know that the maximum selling prices for their crops will remain controlled, and also that it is Treasury policy not to increase the total cost of food subsidies.

During more than a century of fertiliser expansion farm income has been the dominant influence. This has been evident in good times and bad times, in America as well as in Britain. The scien-

tific influence has taken second place to accountancy, although whenever possible farmers have let the scientific influence have a very good run for their money.

However, this item from the Ministry's news service totally ignores the budgetary background, and fears that fertilisers may not be sufficiently used are blamed upon anti-fertiliser propaganda. There has always been a doctrinaire attack upon fertilisers, although its effect upon their development has been almost negligible. The item concludes: "... the propagation of unsound beliefs about the harmful effects of fertilisers is detrimental to the interests of the whole community."

In our view, the open discussion of the pros and cons of fertilisers has never done real harm; indeed, out of heated controversy a well-balanced attitude towards soil fertility has emerged. What can be truly harmful to the interests of the community is a sharp rise in fertiliser prices—unless it is simultaneously accompanied by adequately compensating rises in farm income. And there are no Thomases more doubting than farmers when it comes to economics—especially State-controlled economics—and with good reason, for they, more than most, can look back upon long periods when it was felt that their poverty and insecurity was to the interest of the rest of the community. Technical controversy can look after itself; economic uncertainty is far more dangerous.

New Use for Plums and Dates

By stewing dates and plums according to a secret recipe Charles Vandenbroeck, of Belgium, claims to have produced a fire- and heat-resisting paste.

At a recent demonstration in Brussels to prove the efficacy of his process, he started a fire on a piece of waste ground by pouring a gallon and a half of petrol into a large container above which were suspended a couple of bakelite model aeroplanes and a parcel containing a dozen boxes of matches, all covered with a 2 cm. coat of the date-plum paste.

Another similarly coated bakelite aircraft was dropped into the petrol container.

M. Vandenbroeck then stepped forward and set light to the canister of petrol. With a satisfied smile the inventor stepped back and embarked on half an hour's lecture concerning his plum-date stew to his audience.

After forty minutes the packet of matches was recovered from the flames. M. Vandenbroeck removed the solid crust which had formed round the paper wrapping, ripped open the parcel, and showed the boxes of matches intact.

After forty-eight minutes the fire burned itself out. M. Vandenbroeck removed his model aircraft from the canister, chipped off the same brown crust, and revealed them intact and unscorched.

The final gesture to prove confidence in his invention came when M. Vandenbroeck applied the paste to his hand, thrust it into the flames, and held it there for several minutes. That, too, came out without a trace of injury.

London, a Hundred Years Ago

Though Peter Cunningham's *Handbook of London*, published by John Murray in a full edition in 1850, deals with all the sights of the Metropolis as the main theme—almost as if in anticipation of foreign visitors—the section on taverns and restaurants attracts for the sake of the somewhat futile but amusing pastime of comparing "then and now." Surprise comes with "dinners up to five guineas a head," this at the Clarendon Hotel in New Bond Street. Five guineas, in those days, was a stiff price; but doubtless "the board was filled with lordly fare." To go to the other extreme, there was a place in Billingsgate where, as in *Les Halles* in Paris, you could have cheaply a dinner "excellent of its kind, and punch celebrated beyond the sound of Bow bells."

Often the emphasis is on the Briton's "joint and veg." Why go to those West End restaurants where you will get only "some average French cooking" when many taverns "cook joints every quarter or half-an-hour from 5 to 7 p.m. and charge only two shillings a head"? In 1850 there was still a Thatched House ("very good"), just as there was when Swift wrote his *Journal to Stella* and when brother Bathurst "sent for wine, the house affording none."

There was also a Rainbow, recalling the *Spectator* and its satire against garters and buckles below the knee seen at the Rainbow. This establishment had developed from a coffee-house, one where James Farr was summoned "for making a sort of liquor called coffee—a great nuisance and prejudice of the neighbourhood." Oysters at Pimm's, ices at Gunter's in Berkeley Square, "best buns" at Grange's, or "good homely cooking" at the Blue Posts in Cork Street—all these are covered by Cunningham. Yet most striking compared with today is the association of "tavern" and a good meal rather than mere drinking. With less beer and spirits being sold today, even our provincial taverns are going back to good solid meals offered in rivalry to restaurants which close too early.

On arrival at the factory, the tomatoes are re-sorted, stemmed, and graded.

Guernsey Starts Tomato Canning

BASIL C. DE GUERIN

The large proportion of tomatoes wasted every year through being too small or too misshapen for export, although otherwise perfectly fit for human consumption, impressed Mr. R. Malcolm McCurdy, a Guernsey resident, with the possibilities of canning and thus preserving all this food which would otherwise be dumped. Operations commenced with a home canning machine and the local market soon absorbed its output; the quality and packing of this new line have now attracted the attention of English buyers.

NOT very long after the start of operations on a small scale, Mr. McCurdy found it necessary to move into larger premises and a site was obtained at Piette Road, St. Peter Port, where a building, converted by the Germans during the occupation into a mess for their troops, provided all facilities.

Fortunately the full co-operation of the Ministries of Food and Supply has been obtained. Not only is this a British undertaking, but its aim is to conserve annually large quantities of food which would otherwise be lost to consumers. In the circumstances, therefore, tinplate, cartons, machinery, and other necessities are of more use in the Channel Isles than if sent abroad for foreigners to use on goods to be sold back to the English market. This argument was not immediately apparent, and many other difficulties were encountered before supply permits and export licences were finally approved.

Even today the problems are by no means all solved, but progress made is well illustrated by the fact that within two years of the first can being sealed in Mr. McCurdy's kitchen, a substantial shipment of canned tomatoes had left the island for the English wholesale market.

On licence and in conjunction with The Metal Box Co., who supply the cans used, new machinery is to be installed, which will consist of one or more machines each capable of an output of 20,000 cans per week, working with the No. 4 fruit canning line.

Other developments are also planned which will entail the installation of vegetable canning equipment, but to date only fruit has been handled, with pickles, sauces, etc., being bottled in winter to provide permanent employment for the staff.

Factory with a Difference

Unlike most similar factories, where the produce is brought to the door by the grower, the Sarnia Canning Company work the other way round. A staff of experienced women visit the vineries, where they sort over the piles of tomatoes which have not reached the exacting standards required for shipment. Tomatoes which are misshapen, or "roughs," those which are too ripe to travel, or which have cracked skin, all otherwise perfectly fit to eat, are saved for canning. The only alternative for the many tons of such fruit which are culled annu-

The cans are filled with approximately eight tomatoes to each can.

ally by the growers would be to feed them to cattle or, more frequently, dump them on the waste heap.

When brought into the factory the first process is to re-sort, stem, and grade the fruit. It is then placed in the cans, approximately eight tomatoes to each can, and these are filled with boiling water.

Five can-seaming machines are in use; four worked by a ⅓ h.p. motor and the fifth electrically driven.

The sealed cans are sterilised for thirty-five minutes and, after passing through the cooler, are packed in cartons in which they are kept for an incubation period of three weeks to detect blown cans.

Part of the equipment, showing the boiler, cooler, seamer, and filler.

Labelling is effected before shipment by means of an ingenious chute devised by Mr. McCurdy, an improvement on which is shortly to be placed on the market. Worked entirely by gravity, it is capable of labelling up to 2,000 cans per hour.

Tomatoes are not the only interest of this progressive young company, which has already handled cherries, plums, and pears, and will also can apples in due course. An instance of its initiative was given when an order for canned rhubarb was executed with fruit which was growing at 2 p.m. and was picked, transported to the factory, canned, labelled, and delivered by 5.15 the same day.

By reason of its business organisation, its good canning practice, and its ability to draw upon copious supplies of raw material, it is safe to predict that more will be heard of this up-and-coming firm in the near future.

SUPPLIERS OF EQUIPMENT

Seamers: *E. W. Bliss (England), Ltd.; The Metal Box Company.*
Cartons: *Thompson and Norris Manufacturing Co.*
Complete canning line: *Mather and Platt.*

Correspondence

To the Editor of
FOOD MANUFACTURE

DEAR SIR,—We notice that on page 9 and page 11 of the January issue of FOOD MANUFACTURE you refer to a number of 5,000 gallon glass-lined tanks—storage tanks supplied by R. Marsh and Co., and Prodor-Glas lined tanks supplied by Prodorite, Ltd.

In actual fact, the forty-four 5,000 gallon Prodor-Glas lined tanks installed in H. W. Carter and Company's cold store were supplied by this company, although the steelwork and installation were effected by R. Marsh and Co.

Yours very truly,
G. P. PHILLIPS,
Special Director, Plastics.
Prodorite, Ltd.

Wednesbury, Staffs.

*(We are indebted to Messrs. Prodorite, Ltd., for pointing out the ambiguity in the list of suppliers of equipment referred to.—*EDITOR.)

Production of Milk Substitutes

LUCIUS NICHOLLS, C.M.G., M.D., B.C., B.A.

Throughout the greater part of the tropics and in many lands north and south of the tropical belt little or no milk is available for the poorer classes, its price being far higher than in the countries of the temperate zones. In this article is discussed the feasibility of replacing milk by other foodstuffs possessing similar nutritive properties.

THE infantile mortality rate throughout the tropics ranges from about 100 to 250 or more per thousand births; this is three times higher than in most countries of the temperate climates, where the figures range from about 33 to 80. Many of the deaths in the earliest months of life are due to the debility of offspring born of malnourished mothers; and when the mother's milk fails—a not uncommon occurrence among the labouring-class women of warm climates—death of the infant usually results. The time of weaning in districts where there is no milk supply is, therefore, a time of great hazard.

Public Health Authorities throughout the world have frequently urged the need for an adequate milk supply to combat malnutrition; doubtless they would accept substitutes of comparable nutritive values.

Milk Supplies in the Tropics

Many attempts have been made to ensure a more adequate supply of milk in the tropics. For example, dairies have been established in the lowlands of many tropical countries for the supply of limited amounts of milk to hospitals, to infant clinics, and to those who can afford to pay high prices. Far more milk could be produced in the highlands than at present; but the grazing areas are insufficient to solve the problem for the lowlands, especially where large industrial towns exist.

As an example, great efforts have been made by the Government of Ceylon to overcome these difficulties, their Public Health activities being more advanced than in most tropical countries. Although it has been proclaimed in Ceylon for many years that children from the time of weaning need milk for good growth and health, at the present time the milk distributed at clinics for infants is expensive imported dried milk, despite the establishment of Government dairies. The great majority of the children of Ceylon do not receive milk, or receive it only occasionally and in very small amounts.

Cow's Milk is not Essential

Obviously the mother's milk is essential for her infant, but although cow's milk is desirable to promote good growth and health of children, it is certainly not essential. There were races of well-grown men long before cattle were domesticated, as is testified by the skeletons of men of the early stone ages. These men were mainly hunters, and their children were brought up on larger amounts of meat than is possible among the far greater populations of today.

No particular foodstuff is essential, because all the nutrients needed by man—the amino acids of proteins, carbohydrates, fats, minerals, or vitamins—are found in both animal and vegetable food.*

What is a Milk Substitute?

The great advance in the knowledge of food and nutrition during the past twenty-five years has reached a stage at which it should not be difficult to produce foods from cereals, pulses, oil seeds,† or other plant products having sufficient nutritive values to be adequate substitutes for milk.

For any substitute to have wide use in the tropics the following properties are needed:

1. It must be agreeable to taste so that infants will take it readily.
2. It must be sufficiently digestible and nutritious so that a malnourished child will soon thrive upon it.
3. It must be in the form of an easily emulsifiable powder which can be distributed in cheap containers.
4. It must be cheaper than cow's milk.

Composition of a Substitute

The composition may be based on the following approximate composition of dry whole milk:

	per 100 *grams.*
Protein	26·00 g.
Fat	26·00 g.
Carbohydrate	38·00 g.
Calcium	1·00 g.
Phosphorus	0·75 g.
Iron	0·60 mg.

	per 100 *grams.*
Vitamin A	1,400 I.U.
Thiamine (B_1)	0·3 mg.
Riboflavin (B_2)	1·5 mg.
Niacin	0·7 mg.
Ascorbic acid (C)	6·0 mg.
Vitamin D	20 I.U.

Milk is not a good source of iron or vitamin C, and these might be increased in a substitute.

All of some of the nutrients and the greater amount of others must come from the cereal or other seeds from which the bulk of the preparation is made. Adjustments of the amounts of fat, carbohydrate, and minerals can be made by additions of vegetable oil, cane sugar, calcium phosphate, or carbonate and iron citrate respectively.

The two difficulties are the incorporation of proteins of high biological value and to a less extent the addition and stabilisation of vitamins.

* This statement requires some modification as regards the fat soluble vitamins A and D. Vitamin A is not found ready formed in plants, but its precursors, the carotenes, are very abundant in plants, and during passage through the intestinal canal are converted into vitamin A. Several sterols can be changed into forms of vitamin D by the sunlight, and some of the sterols of plants are not the same as those of the animal body.

† In the present-day world shortage of food it would be advantageous if the proteins of cheap oil cakes were processed for human consumption; about 20 million tons of oil cake are produced yearly.

COMPARISON OF AMINO ACIDS OF COW'S MILK WITH THOSE OF OTHER MATERIALS*

Amino Acid.	*Cow's Milk.*	*Wheat.*	*Maize.*	*White Rice.*	*Soya Bean.*	*Ground-nut.*	*Sunflower Seed.*
Arginine ..	4·3	4·2	4·8	7·2	7·1	9·9	8·2
Histidine ..	2·6	2·1	2·2	1·5	2·3	2·1	1·7
Lysine ...	7·5	2·7	2·0	3·2	5·8	3·0	3·8
Tryptophane	1·6	1·2	0·8	1·3	1·2	1·0	1·3
Phenylalamine	5·7	5·7	5·0	6·7	5·7	5·4	5·4
Cystine ..	1·0	1·8	1·5	1·4	1·9	1·6	1·3
Methionine ...	3·4	2·5	3·1	3·4	2·0	1·2	3·4
Theonine ..	4·5	3·3	3·7	4·1	4·0	1·5	4·0
Leucine ..	11·3	6·8	22·0	9·0	6·6	7·0	6·2
Iso-leucine ...	8·5	3·6	4·0	5·3	4·7	3·0	5·2
Valine ...	8·4	4·5	5·0	6·3	4·2	8·0	5·2

* Block, R. J., and Mitchell, H. H. (1946), *Nut. Abs. and Reviews*, vol. 16, 1249.

The proteins are made up from about twenty amino acids; ten of these cannot be formed in the body and therefore are indispensable, but the others, after digestion and assimilation, can be made in the body from these ten. Therefore, the biological value of proteins depends upon the relative amounts of these amino acids in their composition.

The human body does not need the amino acids in exactly the proportion in which they occur in cow's milk; for instance, leucine is not needed in as great an amount as in cow's milk. Particularly important amino acids are lysine, tryptophane, and methionine.

The proteins of the human body are rich in lysine, as are the proteins of eggs, meat, and other foodstuffs of animal origin. The lower biological values of foods of vegetable origin are to a large extent due to the comparatively poor amounts of this amino acid in these foods.

Protein Values

The protein of soya bean has a high biological value, mainly by virtue of its lysine content. It does not contain, however, as much methionine as is desirable. Maize is far too poor in lysine and tryptophane to be suitable as a main source of substitute for milk, but some fraction of maize might be used to increase the value in leucine. In some respects rice has high biological values. The bulk of a milk substitute might well be prepared from rice and soya bean. It is desirable to use in any country the pulses cheapest to grow in that country, and there are pulses which grow better under tropical conditions than soya bean.

The protein mass of all foods can be fractionated into separate proteins having different amino acid composition. A protein of very high biological value might be obtained by the assembly of fractions obtained from the proteins of several seeds.

The Addition of Vitamins

As only some of the necessary vitamins will be present in sufficient amounts in the cereals or pulses from which the bulk of the substitute is being prepared, others must be added. Two very rich sources of vitamins are yeast and fish liver oils, the former being rich in the water soluble vitamins of the B complex group, and the latter in the oil soluble vitamins. These have been used to enrich food, but they have the disadvantage of imparting to foods slight odours and tastes which are objectionable; and yeast contains unknown substances which are liable to cause digestive disturbances.

The use of synthetic vitamins is more advantageous. About ten years ago small amounts of pure vitamins were placed for the first time on the market at very high prices, but with a rapidly increasing production the price fell. Vitamin B_1 is a good example of this; in 1940 a few pounds of it were manufactured, but nearly 100 tons (100,000 kilos) were produced in 1948, during which time the price fell from approximately £100 to £16 per lb.

For a whole food suitable for infants, and prepared from pulses and cereals, the vitamins required include vitamins A, C, D, and riboflavin.

The cost of enrichment with these vitamins, estimated at not more than 2 per cent. of the total cost, would be one of the smallest items in the preparation of the substitute.

Some vitamins are unstable in that they are easily oxidised or otherwise destroyed, especially in fluids, but their stabilisation in dry powders presents little difficulty.

Past and Present Substitutes

Throughout the ages the Chinese have used soya bean emulsions and curds precipitated from them as a milk substitute. Being rich in proteins, these make good supplements in diets consisting to a large extent of rice or other cereals; yet the nutritive value of soya bean preparations is far from being equal to cow's milk because they lack several vitamins and are deficient in calcium.

A "soya milk" factory has been operating in Hong Kong for several years, the emulsion of the beans being prepared under sanitary conditions and issued in hermetically sealed milk bottles. Although some attempt has been made to reinforce this soya milk with vitamins and calcium, it has not been entirely successful.

Several soya bean preparations have been placed on the American and European markets. One of these is *Soyalac*, a spray-dried emulsion, which is claimed to be an almost complete infant food lacking only vitamin C. This and similar preparations have been successfully used for infants allergic to their mother's milk or cow's milk.

Italian, German, and Indian Work

There has been a great shortage of milk in the war-devastated countries of Italy and Germany, and attempts have been made to find a milk substitute for infants and children. One such substitute, called *Maltavena*, was produced early in 1945 by Dr. Caprina, chemist to the Peroni brewery, Rome. It consisted of an emulsion prepared from a cereal which had been malted in the usual manner of brewers; later malted soya bean was included as well as the cereal. The idea was taken up by a British Medical Unit working in Germany, and a modified product was used with con-

siderable success in feeding infants and children. This product has been developed on a small commercial scale under the name *Lactavena*.

Considerable work on this problem has been carried out in the department of biochemistry of the Indian Institute of Science, Bangalore, where the soya bean has received most attention, but preparations from green gram (*Phaseolus aureus*) and the groundnut have also been the subject of extensive experimentation.

Future Trends

Much work has been done in laboratories, where many preparations have been elaborated for the successful rearing of young rats and other animals. There have also been many more feeding trials with infants and children than those outlined in this article, but as yet there has been no large-scale production of any of these preparations.

It is unlikely that milk will be replaced by any vegetable substitute in comparatively prosperous countries such as America or Britain where cattle flourish, or that substitutes will be able to compete where milk has been largely used for many generations.

The competition over large areas of the tropics is not with milk but with cereal foods, the best example being cereal paps which are used for the weaning of infants. These paps are far too rich in starch, and have deficiencies in respect of proteins, several vitamins, and minerals. A vegetable food reinforced with everything in which cereal paps are deficient should be sufficiently widely acceptable to make a success of large-scale production, especially in those countries such as India where vegetarianism is a religious tenet among much of the population.

There has been a missing link between the many investigations in laboratories and large-scale production on a commercial basis. The problem needs the collaboration of chemical engineers experienced in food processing in setting up pilot plants in which several tons of any promising foodstuff can be prepared so that there may be large-scale trial feeding among infants and school children.

Agricultural Research in N. Ireland

THE existing facilities for research are to be extended in three main directions, according to the report of the Trustees of the Agricultural Research Institute of Northern Ireland for the year 1948 to 1949.

It is anticipated that work on the conservation of crops will deal mainly with the development of economical and efficient methods of making grass and crop silage, but the investigations will also include methods for improving the efficiency of hay-making.

The work in animal breeding will be directed mainly towards developing superior strains of dual purpose Dairy Shorthorns, Large White pigs, and White Wyandotte poultry.

Nutritional work with cattle will be designed in conjunction with the breeding policy to test, *inter alia*, the beefing qualities of bullocks from the Institute's Dairy Shorthorn herd.

Experiments carried out during 1946-47, which showed that maintenance of a constant daily level of starch equivalent intake resulted in no differences in growth and carcass quality between pigs receiving high and low fibre diets, have been continued. The increase in the growth rate of the groups receiving the high fibre ration at the higher level of intake was not accompanied by a firmer backfat. Thus it would appear that in practice any ration high in fibre is likely to result in soft, thin backfats, irrespective of starch equivalent intakes.

Mushroom Growing in U.S.A.

MUSHROOM growers from all over Great Britain recently attended a meeting to hear Mr. O. E. Gahm, of W. Darlington and Sons, mushroom spawn manufacturers, give an account of his 1949 visit to the U.S.A. and Canada, when, in addition to studying the latest developments in tray cultivation, he conferred with scientists in charge of Federal Projects on Diseases and Pests.

Only one-third of the American production was marketed in the fresh state, he said, the remainder being canned in brine or converted into mushroom soup. Gradual alleviation of the food situation in Great Britain, with increasing production of mushrooms, would, Mr. Gahm foresaw, create the need for processing as a means of stabilising prices and finding new markets, and he urged the use of national advertising to stimulate the demand for fresh and canned mushrooms, and the development of new markets for the processed product in the Far East.

On the larger American plants every possible type of mechanisation had been introduced to minimise labour costs; increased yields per ton of manure were obtained by quickening the rate of fermentation to increase the number of square feet of compost per ton, by decreasing the depth of compost in the beds and peak heating to ensure the control of diseases and pests, and by employing the two zone tray system. Tray culture was ideal for cropping in caves and mines without heat. Roller conveyors and electric hoists handled the trays, and special rooms were provided for peak heating, fumigation, and the growth of the spawn under controlled conditions.

Peak heating, or pasteurisation, which had become the standard practice in the U.S.A. for some years, was defined by Mr. Gahm as the process of getting the beds to heat up to 130°-140° F. after filling, the duration depending on moisture content, physical texture, and *p*H. Sulphur and cyanogas were generally used by U.S. growers at peak heat, and activated pyrethrum and nicotine for routine dusting. The use of DDT on mushroom beds was not encouraged, except for spraying interiors before filling.

American growers always picked in the button stage, and marketed in 3 lb. baskets, in 1 lb. cartons, and in pint packages.

Fresh Fish in Aluminium Containers

FOODS from the sea have always been a substantial item in the diet of British people. Originally, they were drawn from coastal waters and were largely consumed by the people in adjacent areas; thus the inherent tendency of marine foodstuffs to deteriorate relatively quickly constituted no great difficulty. Preservation problems did not occur until the nineteenth century, when population and the scale of operations of the fishing industries increased. The interval between catch and consumption has lengthened progressively, and now it may be as much as five weeks in the case of the first catch by trawlers fishing in distant waters.

A new way of distributing fresh fish, which it is anticipated will bring about a revolution in the present methods of fish handling, has lately been put into practice. Consisting of the packing of fish fillets in aluminium containers, this latest venture may be the forerunner of similar packaging methods for other types of perishable foods.

Fish Preservation Problems

During the past hundred and fifty years, new ways of overcoming the effects of the instability of fish have been evolved and submitted to the final judgment of the consumer. Fish has been smoked, canned, pickled, frozen, and dehydrated. All these practices are still in extensive use, and the gradual acceptance of these and other methods is gradually building up the proportion of foodstuffs from the sea in our total food consumption.

The amount of fish treated in the way mentioned is small compared with the vast quantities consumed in its natural form. Maintenance of the quality of fresh fish for a long period, therefore, continues to be the central problem in treatment and distribution. At the same time, simplification is being sought by reduction of the time factor. Preparation and packing in factory ships with frequent service to markets is the most likely long-term development in this respect.

The foregoing briefly outlines the background considerations which have brought forth a new procedure designed to preserve the freshness of fish for retail distribution in several main centres in Great Britain, and to eliminate current defects between retail shop and kitchen. Choice fresh filleted fish in wide variety is now starting to be packed in aluminium containers in factories near Hull fish docks, and being conveyed with the least practicable delay to wholesalers and retailers in London, Manchester, Southampton, and other cities for sale to the general public.

The originator of the idea and inventor of the container is Cyril W. Saunders, managing director of Consumer Packs, Ltd., of Hull. Fish to be packed is carefully selected from each day's landings and conveyed by motor truck to the preparation plant nearby.

Packing the Fillets

The fish are packed in fillets—that is, a slice of fish the length of the body—each fish, therefore, furnishing two fillets. By careful cutting, the fillets contain scarcely any bones. The skin is generally removed, but is left on in cases where easy identification of the species by the consumer is desirable.

Filleting, by means of simple hand tools, is carried out by skilled operators under a rigid system of inspection.

In addition to the advantage to the consumer of the fillet form, providing all the edible meat without the trouble of dressing, there is the factory advantage that the waste is in one piece, which facilitates collection for despatch to the fish meal factory or department. Operators quickly acquire remarkable skill, and no machine has yet been evolved that can compete with them in speed or accuracy.

Washing and Sealing Operations

Haddock, small cod, plaice, flounder, whiting, and other small species are the most suitable for this type of packing. Fish weighing about 4 lb. are preferred for filleting, as the product is then of convenient size and weight for cooking. The final operation before the fillets are laid in the aluminium containers is washing. The wash water is usually lightly chlorinated, about five parts per million, to destroy surface bacteria. In containers ranging from 1 to 14 lb. capacity the fillets are fairly tightly packed, thereby displacing practically all air. The sealing operation is performed by simply rubbing the box flanges and edge of the self-positioning recessed lid against appropriate tools. The thickness of the metal varies from 0·006 in. for the 1 lb. size to 0·01 in. for the 14 lb. size, so that no great pressure is needed to make the double fold of the airtight and stiffening seam.

The result is a solid block of fresh fish surrounded by a light sheet of aluminium, which has responded well to exhaustive transport tests. Even with comparatively rough handling and exposure to high summer temperatures, the containers have reached distant destinations without being seriously dented, with the contents excellently preserved. The pack is easily opened by cutting the lid with a knife.

Container sizes are:

1 lb.	...	6 in. × 3 in. × 1 in.
2 lb.	...	6 in. × 4 in. × 1½ in.
3½ lb.	...	8 in. × 5 in. × 1½ in.
7 lb.	...	10 in. × 9 in. × 2 in.
14 lb.	...	12 in. × 10 in. × 3½ in.

The three smallest packs, to be sold in that form, are put into cardboard containers for protection during transit to wholesalers and retailers, and the larger packs are transported to nearby destinations or packed in wooden boxes for rail transport.

The high moisture content of the airtight container, coupled with the high heat conductivity of the thin aluminium walls, affords excellent protection against high air temperature. Latent heat of evaporation of the moisture is readily dissipated in the atmosphere of the container, so that the evolution of heat from slight chemical action within the mass automatically brings about a compensating fall in temperature. During transit the air surrounding the fish is nearly always fairly turbulent, which favours the cooling operation.

As a result of many tests it has been proved beyond doubt that fresh fish treated and distributed in this way reaches the consumer in good condition. Even so, various consumer objections are anticipated, the most serious of which may be that the consumer cannot see the commodity before buying. Despite the fact that the same difficulty applies to all canned foods, there is evidence that specific action is necessary to meet this objection with regard to this particular article. As in the case of other canned foodstuffs, it is believed that acceptance

The pack is easily opened by cutting the lid with a knife.

will eventually be based on the confidence of the public in the brand or the implicit guarantee of reputable distributors.

Of the first hundred thousand packs, 60 per cent. are in 7 lb. and 14 lb. sizes, and the remainder in 1, 2, and 3½ lb. sizes. The latter group will be sold only in packed form, but the larger containers will be supplied to fishmongers, hospitals, and catering establishments. Fishmongers will thus be able to combat objections by offering either fresh fish taken from the larger containers or the smaller unopened packs.

Fish Handling made Easier

Supported by the guarantee that the quality is the same in each case, it is hoped that the consumer will be happy to be relieved of the unpleasant necessity of carrying wet fish wrapped in paper to the detriment of other contents of shopping bags. Such precautions are based on experience of the conservatism of the British housewife. This factor has received careful consideration in assessing the initial quantities to be offered, and its importance is reflected in the fact that the weight of fish to be offered in this form is only a low percentage of the total output of the distributors concerned.

When the consumer can handle the fish before buying there can be little cause for complaint if the quality subsequently deteriorates. When the consumer buys on the integrity or guarantee of the supplier, as in the case of packed foods, a long chain of responsibility is created. In the case of packed fresh fish, it goes back to the main distributor, who buys on the fish dock or market. As the first buyers of the catch, these firms are in a position to influence the operations of the fishing fleets and the methods of handling fish on the trawlers. It is clearly in their interests to cut down the time between catching and packing the fish, and the ultimate development is clearly the packing of the fish at sea together with quick transport to the final buyer.

This is envisaged by the sponsors of the method, but cannot be practised until justified by a very large market for the product. Meanwhile, a comparable result can be obtained by rapid treatment and distribution of the freshest fish from the daily landings.

(*Concluded at foot of next column*)

Daily deliveries will be made to retailers; thus it is reasonable to assume that the most remote consumer will be able to buy the packed fish from a retail shop the day after landing. The fish used for this purpose will have been caught about three days at the most before landing, and will have been preserved by ice after gutting at sea. The maximum time involved will thus be about four to five days, which compares very favourably with the average of about ten days in present practice.

Applied Bacteriology

Among the papers presented at the 1949 Conference of the Society for Applied Bacteriology was one on "The Production of Polysaccharides by Rod-shaped Bacteria in Sugar Factories and Refining Processes," presented by Miss M. P. Scarr of Tate and Lyle. In these industries trouble can arise from mucoid deposits in strainers and pipelines. Miss Scarr found that this was probably a laevan and possibly produced symbiotically by *Bacillus pedunculatus* (Koch, 1894) or *Nesvkia pedunculatus* (Bergey, 1948) and a species of Zygosaccharomyces. Regeneration of the charcoal used in refining is sometimes rendered difficult by the presence of gums. In this case a rod-shaped anaerobe, which was markedly capsulated in sucrose, was found to be the causal organism; the original source of the contamination was the beet sugar liquor. After cleaning, treatment of the plant with calcium bisulphite containing not less than 200 p.p.m. sulphur dioxide successfully overcame the trouble.

Two contributions dealt with the nuisance due to evolution of hydrogen sulphide gas in waste waters. The first, by Dr. L. A. Allen, of the Water Pollution Research Laboratory, dealt with the factors affecting production of hydrogen sulphide by sulphate-reducing bacteria in sewage, and the second, by Mr. K. R. Butlin, of the Chemical Research Laboratory, with the activities of sulphate-reducing bacteria in water. In Mr. Butlin's experience successful control of the trouble could be obtained if the acidity could be increased to *p*H 3·0-4·0.

Dr. C. B. Taylor, of the Butterwick Research Laboratories of I.C.I., gave a report on the results of an investigation on the effect of phosphorus on the decomposition of organic matter in water. In his experience ferric ions have a restricting action on the decomposition of organic matter since the phosphate in the iron-phosphate complexes may only with difficulty be available to the bacterial cell. Where the iron-phosphate ratio is high this may be a significant factor in fermentation processes, in estimations of the biochemical demand of liquors, and in agricultural soil.

Banana Technology

Forming part of the series of monographs on the chemistry, physiology, and technology of food and food products, edited by Z. I. Kertesz, is a book* devoted to bananas.

In this book emphasis is laid on the biochemistry of the fruit and its products. It is intended for those engaged in fundamental researches so that they may be cognisant of the work already accomplished or in progress, and better informed of the path ahead.

Beautifully printed and produced, this book, in its nine chapters, discusses the history and growth of the trade, structure and development of the tree, commercial storage and ripening methods, chemical changes during ripening, transportation, banana products, nutritive value in health and disease, diseases and insect pests, and a review of world banana production and trade.

That this volume is packed with the maximum of information is evidenced by the fact that in its 189 pages are contained no less than 488 references to the literature.

* *Bananas.* By Harry W. Von Loesecke. Pp. 189+xi. Interscience Publishers, New York and London. Price 36s.

The Baking Industry

Progress in 1949

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Dr. Norman Wright, Chief Scientific Adviser to the Ministry of Food, speaking at the luncheon held on the occasion of the annual meeting of the British Baking Industries Research Association, reminded his audience that baked products provided more than one-third of the nation's calorific intake. Dr. Wright added that as much protein was derived from bread and flour confectionery as from meat, milk, and eggs together. He put the current annual figure for bread consumption at four and a half million tons and the corresponding figure for cake at eight hundred thousand tons. The confectionery was valued at one hundred and thirty million pounds. This article reviews the developments, position of supplies of raw materials, and other aspects of this important industry during the year 1949.

THE figures given by Dr. Wright serve to show the importance of the position occupied by the baker in the food manufacturing industry. He seldom builds establishments so imposing as those erected by the makers of patent foods, nor does he advertise his goods very much; when he does, they are usually limited to proprietary breads and biscuits. Bread is such an obvious necessity that its presence is taken for granted. Bread, however, has been "regulated" by those set in authority for hundreds of years and now cakes, as well as ale, are regulated too. These regulations of one kind and another play an important part in trade politics.

Trade Topics

In the early part of 1949, for example, the subsidy on bread was reduced by 2d. per sack to 7s. 1d. per sack and the additional shilling payable on each of the first fifty sacks of weekly output was discontinued. Subsidy was then increased by 1s. 3½d., and later a further increase of 8d. per sack was allowed, bringing the total to 9s. 0½d. from March 27, 1949. Each of these changes was the result of prolonged negotiation and each gave rise to much discussion.

Several attempts have been made to free flour confectionery from price control altogether or to lift 2s. 6d. per pound maximum. None has been successful,* and the chocolate éclair continues to be served in the café for threepence or more while the same article in the shop is restricted to twopence or less.

The art of the pastry cook in keeping his product "light" is not encouraged by present regulations which relate price to mass rather than to the delight of the palate. This topic has also received a fair share of attention during the past year, but the objective school has again prevailed and value still resides in the tangible and the concrete—if that is the proper word to use!

Pleasurable sensations of the palate are difficult to measure, and "taste differences" are a complicated business. The Eccles cake, for example, made with a thin shell of puff pastry based on Siberian butter, filled with plump, swollen, shade-dried *Vostizzas*, mixed with Demerara and flavoured with rum, appealed to some but revolted others who preferred choux pastries sprinkled with icing sugar and filled with whipped dairy cream. The Eccles cake had juicy substance and was capable of being weighed; the cream bun was enormous but insubstantial. The idea of selling such choux pastries by the pound conjures up the vision of an airy mountain of confectionery registering less than nothing on the scales of the inspectorate.

Flour Restriction

The restriction on flour supplies for breadmaking, which was in force during the period under review, has been suspended from January 28.

The Wages Council made alterations in the wage structure during the year, and normal weekly working hours were reduced from forty-eight to forty-six. The wages paid on the forty-six hour basis were held at those previously payable for forty-eight or were increased. The pros and cons of the night baking problem continued to be ventilated and strike action was threatened on this issue, but wiser counsel prevailed.

Frozen Egg Supplies

Frozen egg began to be issued more freely, and there was some protest about this from smaller traders lacking refrigeration facilities because dried egg allocations were correspondingly reduced. There have also been complaints about the inferior quality of some consignments of frozen egg.

Since sweetened fat has helped substantially in relieving the shortage of fat and sugar, egg has probably become the greatest limiting factor in flour confectionery production. Few craftsmen will grumble at receiving *good quality* frozen egg in place of the dried product because although dried egg is convenient to use, few samples are free from a trace of cooked flavour, and still fewer can be used in sponge goods without substantial assistance from chemical aerators. These seldom improve, and often destroy, palate appeal especially when they are used indiscrimin-

* The ceiling price was raised in January, 1950, to 3s. per pound.

ately. They are good servants that can all too easily become bad masters.

Bakery Education

The National Board for Bakery Education announces that ninety-three candidates were awarded the National Diploma at the conclusion of their two-year full-time courses in bakery schools throughout the country. Thirteen scholarships, each of the value of £150, were awarded by the Board. The enrolment of students, both full-time and part-time, reached 5,583 at eighty-two centres, and eighteen new teaching centres were opened during the year. In October a one-day conference on bakery education was organised in Leeds and a number of useful papers were read; Dr. Goodfellow, in his paper "Sanitation in the Bakery," mentioned the difficulty of cleaning certain older types of bakery machinery, and he advocated streamlining for reasons of cleanliness. This has frequently been done with modern equipment, sometimes at the expense of accessibility for purposes of adjustment or repair. The north-west region also held a bakery teachers' conference in February.

During the year the trade suffered the loss of John Kirkland and Harry Lee, both of whom were pioneers among bakery teachers and whose work at the Borough Polytechnic will long be remembered by those who had the good fortune to be taught by them.

Hygiene in the Bakery

The increasing interest in the conditions under which foods of all kinds are prepared resulted in the submission by the Ministry of Food of model by-laws to Local Authorities. These regulations have been criticised for their ambiguity by several of the food trades associations, and wherever they are adopted there will probably be difficulties and differences of interpretation. This observation, however, is not peculiar to these particular regulations.

The cleaner food campaign, the release of limited quantities of waxed paper, and the lifting of the ban on bread wrapping in November have given rise to some controversy because it is widely held that the price margin allowed for wrapping bread is insufficient to cover the cost of providing this service. As a result, there are regions where little or no wrapping is in progress. The problem of overalls is not unconnected with hygiene. Good overalls, well maintained, contribute greatly to a high standard of personal cleanliness, and it is unfortunate that supplies of such garments can only be obtained with considerable difficulty.

Work at Chorleywood

At the official opening by H.R.H. the Duchess of Kent of the British Baking Industries Research Station in June, Mr. Herbert Morrison, Lord President of the Council, gave a judicial address in which he stressed the necessity for continued and increased industrial support of the Association, whose work can only be carried out at a rate related to the funds available.

The research station, following its work on hydrocarbon oils, has continued to take a keen interest in nutritional matters affecting the baking industry, and has fully maintained its many service facilities. Membership of the Research Association passed the thousand mark during the year, but there remains plenty of scope for the recruitment of new members.

Technical Literature

In addition to the papers of direct interest to bakers, an important and recurring theme during the year has concerned the abstracting and indexing of scientific and technical literature. In June, an international conference was held in Paris on this subject by UNESCO.[1] In August, H. W. Cremer's address on "The Scientific Communication" was published.[2] This was followed in November by a group of papers by Findlay, Dyson, Holmstrom, Gerard, and Cockburn[3]—each a valuable variation on the main theme. "Of making many books there is no end; and much study is a weariness of the flesh." Effective and co-ordinated abstracting can do much to reduce the weariness.

Further work on amylase activity, nitrogen trichloride and chlorine dioxide effects, and on nutritional aspects of flour and bread has been recorded. Fisher *et al*[4] have made a useful contribution to the literature on dough testing equipment. Erlich and Burkert[5] report interesting results in their survey of the activation of amylases by electrolytes. Hlynka[6] suggests a theory to explain the influence of bisulphite and acetaldehyde on a three dimensional gluten network, while Edelmann and Cathcart[7] have continued the work on surface active agents and their effects on the softness of bread crumb. Exhaustive hearings concerning these materials have recently concluded in America, and it is difficult from the reports available[8] to sort out propaganda from scientifically established fact.

Keeping Quality of Bread

Controversy has centred around the physiological effects of polyoxyethylene stearate and similar substances. Evidence that these are harmless has been submitted, and although doubt has been cast upon the adequacy of the data, no published work appears to have established that they are harmful. The mechanism whereby such esters improve bread keeping quality (as they undoubtedly do) is not yet understood. From the technical and scientific point of view the effect of these products in breadmaking, used at the rate of less than 0·1 per cent. of the flour weight, is most interesting. It is to be hoped that they will receive careful and objective consideration.

Bice and Geddes[9] have developed further methods for the measurement of the changes which occur during bread staling. They advocate a variable load/constant strain technique rather than the more usual method of taking compression readings under fixed load.

Bate Smith[10] discusses the organoleptic testing of dried egg, and E. C. Wood[11] continues his work on the same subject with special reference to its statistical aspects. He quotes Fisher on a point that will be fully appreciated by all engaged in production control—"the 'one chance in a million' will undoubtedly occur with no less and no

more than its accustomed frequency however surprised we may be that it should happen to us." How often that quotation is aptly used in any food factory turning out hundreds of thousands of units a week we can only guess, but the frequency must be fairly high!

The Work of Tasting Panels

R. G. Tomkins,[12] referring to the work of tasting panels, makes the following observation: "No advantage is gained by adding together the marks given separately for colour, flavour, and texture in order to get an overall assessment of quality. Totalling marks obscured the judgment on specific characteristics, and it was found that failure to obtain an adequate standard in respect of any one criterion is sufficient to render a product unacceptable. In other words, the function of a taste panel is to eliminate the undesirable rather than to classify the acceptable." Although Tomkins was dealing with dried vegetables, his remarks have a direct application to flour confections.

The symposium "Recent Advances in the Fermentation Industries,"[13] held at St. Andrews in June under the auspices of the Royal Institute of Chemistry, was an interesting and enjoyable event for those fortunate enough to be present.

Bransom and Dunning[14] deal with some mathematical aspects of particle size distribution as determined by the photoelectric sedimentometer, and Blake[15] compares three methods for determining the surface area of fine powders. These two papers are mentioned because of their possible applications to problems of flour granularity.

Bradshaw and Coppock[16] describe a micro oven technique for studying the changes that take place in doughs and batters during baking. Coppock and Cookson[17] give an analytical method for the determination of mineral oils in bread, and suggest that a limit of 0·2 per cent. should not be exceeded. This recommendation was adopted in a subsequent Statutory Instrument.

Any baker who has observed the behaviour of slack doughs in a vertical type mixer would be interested in the pictures of the Weissenberg effect in a paper by Reiner *et al.*[18] This is one of the few papers of rheological interest to bakers published during the period under review.

The report on the evaluation of flake tragacanth[19] has points of interest to the confectioner. It was observed that ground samples produced mucilages of lower viscosity than flake, and that laboratory ground material showed a lower decrease due to grinding than commercial samples.

A. E. Parkes[20] describes a simple apparatus and routine for limit tests on samples of baking powder or self-raising flour in which a calibrated mercury manometer is used to indicate pressure of carbon dioxide in a manner similar to that employed by the Sandstedt apparatus for fermenting doughs.

Plant Developments

One particularly interesting paper[21] gives a fully illustrated description of a new Californian bakery plant showing trough elevators, water control units, and moulder panners. O. J. Kahlenberg[22] summarises recommendations for defrosting frozen egg, and supports the well-tried circulation of water at 50° F. to 60° F. as giving the best results. Selman[23] describes an electronic device known as the "Mixatron" for recording dough consistency. It is difficult to understand from the data given how the instrument can provide more useful results than those given by a recording ammeter.

In addition to contributing a paper on the measurement of flour colour to the Society of Public Analysts and Other Analytical Chemists, D. W. Kent-Jones, during the year, gave the three Cantor lectures to the Royal Society of Arts on Milling, Baking, and the Nutritional Value of Bread. These papers were the first directly concerned with breadmaking to be read to the Society since those given by William Jago in 1889.

Flour Confectionery

The Nutrition Panel of the Food Group of the Society of Chemical Industry in its series of meetings on manufactured foods included four papers on "Flour Confectionery as Food." A brief account of these papers has already been published,[24] and one of the papers[25] has been published in full.

The meeting was opened with an introductory paper by Butterworth, who dealt with the composition (in terms of raw materials) of the major products, and described a systematic classification of flour confections. Fuller's paper was concerned with the food values of cakes, and Freeland and Bradley dealt with biscuits in a similar manner. Yudkin discussed the place of cakes and biscuits in the diet as a whole.

Packaging Problems

Forstner and Fuller[26] had earlier contributed a paper of considerable interest to confectioners in which they referred to the importance of equilibrium humidity in food packaging. They referred to packing difficulties met with in dealing with fruit pies and fondant-covered cakes. It was pointed out that in cakes of this kind, because the equilibrium humidity of the cake base is normally higher than that of the fondant covering, there is a transfer of moisture from cake to fondant when the whole confection is enclosed in a moisture-proof wrapping. The stickiness thus engendered can be overcome if the equilibrium humidities concerned are made more nearly identical, but this may alter in an undesirable way the character of the confection.

REFERENCES

1 *Chem. and Ind.*, 1949, p. 667.
2 *ibid.*, p. 583.
3 *ibid.*, p. 819.
4 *Cereal Chem.*, **26**, p. 81.
5 *ibid.*, p. 239.
6 *ibid.*, p. 307.
7 *ibid.*, p. 345.
8 *Bakers Digest*, **23**, p. 43 *et seq.*
9 *Cereal Chem.*, **26**, p. 441.
10 *J.S.C.I.*, **68**, p. 78.
11 *ibid.*, p. 128
12 *Chem. and Ind.*, 1949, p. 167.
13 *ibid.*, p. 569.
14 *J.S.C.I.*, **68**, p. 80.
15 *ibid.*, p. 138.
16 *ibid.*, p. 234.
17 *ibid.*, p. 274.
18 *ibid.*, p. 327.
19 *Anal.*, **74**, p. 2.
20 *ibid.*, p. 261.
21 *Bakers Digest*, **23**, p. 19.
22 *ibid.*, **23**, p. 63.
23 *ibid.*, **23**, p. 102.
24 *Chem. and Ind.*, 1949, p. 416.
25 *ibid.*, p. 771.
26 *ibid.*, p. 803.

Apple Juice in Europe

A STUDY by Dr. A. Pollard of the apple juice industries of Switzerland and France, contained in the recently published 1948 Annual Report of the Long Ashton Research Station, will be of great value to British producers of unfermented fruit juices. In Switzerland especially, where progress has not been held back by war and where expansion was early stimulated by anti-alcohol legislation in the 'thirties, the development of the apple juice industry has made great advances.

Switzerland, whose population is 4½ millions, produces 9 million gallons per year, while in Britain, with more than ten times the population, half a million gallons are produced. Another fact somewhat relevant to this comparison is that the apple tonnages produced by the Swiss and the British are about the same. However, as Dr. Pollard points out, Britain's larger population creates a bigger demand for eating apples and it is unlikely that we could ever reach the Swiss figure.

Standardised Juice Wanted

Pear juice is often added to apple juice in the Swiss product, but when this is done it is labelled "Fruit Juice," whereas "Apple Juice" is used only for genuinely pure apple products. A standardised juice is aimed at by most manufacturers—sweet, low in tannin, about 0·5 per cent. malic acid, and usually only slightly carbonated. Brilliant clarity and freedom from deposit are universal. The final stabilisation treatment is either a sterile filtering treatment or bottle pasteurisation. Flash pasteurisation is apparently not popular.

It was thought in England, before the war stopped further progress in this industry, that a holding method of bottle pasteurisation led to a poor product with a cooked or "apple-pie" flavour, and for this reason the more difficult and cumbersome sterile filtering treatment was assumed to be superior. Nevertheless, Dr. Pollard reports of this Swiss industry, which has developed a consumer-demand eighteen times larger than ours, that the pasteurised taste is only occasionally detected and then but slightly, and that it is sometimes difficult to distinguish between the sterile filtered and the pasteurised juices.

In France apple juice development has been slighter and in a rather different direction. Owing to the French taste for "body" in wines and other drinks, a cloudy product has been more popular than the thin and brilliant juice favoured in Switzerland and Great Britain. The bulk of the apples used for the French juice is of cider type. Much of the juice produced is actually blended with fermented juice to produce a range of sweet ciders. It seems that the juice and cider industries are intimately mixed, so that most factories enjoy considerable flexibility in deciding whether to sell a final product of fermented or unfermented nature.

The sterile cold-processing method is not favoured, pasteurisation being adopted for stabilising the unfermented products. The French methods of control during handling and storage are much less rigorous than those of the Swiss, but the consumer-preference for a cloudier product is a factor of some influence here.

The French are able to adopt different methods of clarification, either "keeving," which is a slow and natural pectase action during which much of the solid matter settles out, or a flash heat treatment followed by centrifuging; in this way the natural nitrogen content of the juice is greatly reduced and the risk of fermentation minimised.

Fertilisers and Soil Fertility

THE thunderings of the "muck-and-mystery" conventicle of denigrators of chemical fertilisers and upholders-at-any-cost of "natural manures" have diminished lately.

Orthodox modern agriculturists, and particularly British scientists of the Rothamsted school, were, and are, targets for the devotees of compost; yet the only agricultural scientists of note who have laid undue stress on "mineral" fertilisers were a German and a Frenchman who flourished last century. Upon arbitrary misconceptions did the Howard testament burgeon.

As Mr. Hopkins points out in his book* (quoting Stephen Leacock), a half-truth, like a half-brick, is a more forcible argument than a whole one; it carries further. That the unqualified assertions about the value of humus and the defilement wrought by fertilisers upon worms were seldom countered in words by orthodox scientists was partly due to their perceiving that it is useless to discuss a man's religious beliefs, and vain to repudiate the soundness of the dogmatic basis of his creed or to argue point by point about the reasonings he erects upon a given doctrinal foundation.

Mr. Hopkins has, nevertheless, been goaded into this detailed reply, which amounts to a very patient, gentle, and unassuming examination and statement of the case for using both fertilisers and organic manures in order to maintain present standards of food production.

His argument might have been more telling had he been more forthright and laid emphasis on first principles. As it is, he deals very quietly with folly, and is at pains to grant all that can be granted and to hurt nobody's feelings.

To chemists, the book will be a useful source of notions about British chemical requirements for agricultural and horticultural production. It is not a treatise on fertilisers, but seeks mainly to give reasons rather than statistical facts; to explain *why* rather than to say *how*; and it justifies its sub-title, "a simple presentation of contemporary knowledge and opinions about fertilisers, manures, and soil fertility." It is, therefore, unique, and recognition of its value and interest is expressed by its going into this third edition.—H. N.

* *Chemicals, Humus, and the Soil.* By Donald P. Hopkins. 3rd Edition. Pp. 278. Faber and Faber, London. Price 12s. 6d.

Efficient Operation of Drying Plant

LEO WALTER, A.M.I.Mech.E., A.M.I.Plant.E.

Part I

Among the range of machinery installed in a factory it is the drying equipment whose efficiency can be most easily marred by wrong operation. Consequently, this type of plant equipment should receive constant attention and frequent testing to achieve top efficiency. Overloading, underloading, too high steam supply pressures, wrong fan speed, bad heating surfaces, stagnant hot air between heated rollers, dead or cold spots in hot air driers, waterlogged or airbound heating coils, wrong conveyor speed, lack of measuring instruments for temperature and humidity are only a few items from the long list of deficiencies which may be encountered in practical drier operations. In this series of articles the author describes the ways and means of achieving efficiency in all stages of these operations.

BY looking more closely into the costing side of drying, and by comparing figures from tests in similar manufacturing processes, it has been found that, for example, steam consumption per unit manufactured product varies for drying operations from 1 to 3. This discrepancy can sometimes be traced to a difference in drying methods for the same product, to the use of more modern drying plant in one instance, or of outdated drying equipment in another factory. Where comparison between similar driers discloses that wrong operation alone is the cause of waste of time, heat, fuel, reduced output, or of irregular quality, the remedy is clear — investigation of drier efficiency by obtaining exact figures under working conditions. Such data can then be compared with design figures or with maximum results obtained in similar plants elsewhere.

Under present-day conditions, drier efficiency is (like heat and fuel efficiency, and efficiency of manufacturing methods in general) not only the concern of the individual factory, but is a national affair, because waste of heat and fuel must be eliminated wherever it occurs. Improvements can be achieved by a more scientific approach to the operation of the drier, and by reconstruction, such as by adding recirculation of air, by fitting measuring and control instruments, by baffling, or by improving heat transfer and distribution of heat.

In some cases the works engineer will be able to perform simple observations and measurements himself, and to find out the deficiencies of the drier. An ambitious plant engineer should satisfy himself whether he runs all his drying plants at top efficiency, and he should not be content to have a satisfactory output without making sure that he dries at the lowest possible cost.

Classification of Drying

A rough and ready grouping of drying apparatus can be made by considering the heating medium, which can be steam, hot water, town gas, electricity, gases from combustion, hot oil, or heated chemical solutions having a very high boiling point. Hot water can be used at low pressure, or as high-temperature hot water working at higher boiler pressures. (See Fig. 1.)

Another classification can be made regarding the performance of heat input. The usual way is to use hot air for heating up the materials and carrying away moisture. Surface drying, however, implies contact of material with hot surfaces, such as heated rollers or cylinders and hot platen presses. Drying by means of radiant heat rays, emanating from incandescent surfaces, is another method. High frequency drying is sometimes applied, using electricity in a special modification for penetrating a substance and heating up its particles. Spray drying is applied to liquid substances, such as milk, blood, and chemical solutions, using hot air as the heating medium, and a fine mist of the material for evaporation of the liquid component, whereby the solid component emerges as a fine powder. Drying of gaseous substances can be performed by cooling the gas below its dew point, whereby the vapour content condenses, giving a fine mist or dew on the cooling surface. Other methods of drying of gases (including air) use hygroscopic substances, such as silica gel or activated alumina, or hygroscopic liquid sprays, which eliminate the moisture content from the gas, during its passage through a dehumidification apparatus. (See Fig. 2.)

Factors which generally influence rate of drying are temperature difference between heating medium and heated substance, moisture content of material to be dried, air movement and distribution, dryness and temperature of air or surface temperature, and speed of rotation of drying cylinders. The purpose of an efficient drying apparatus is to evaporate the maximum amount of moisture within the shortest possible time without lowering quality of the material. This has to be done at minimum cost, using as little heat, power, and labour as possible.

Definition of Drier Efficiency

Drier efficiency can be considered in terms of output of dried material and the cost of drying per pound or per ton of material. Thermal efficiency can be defined as the re-

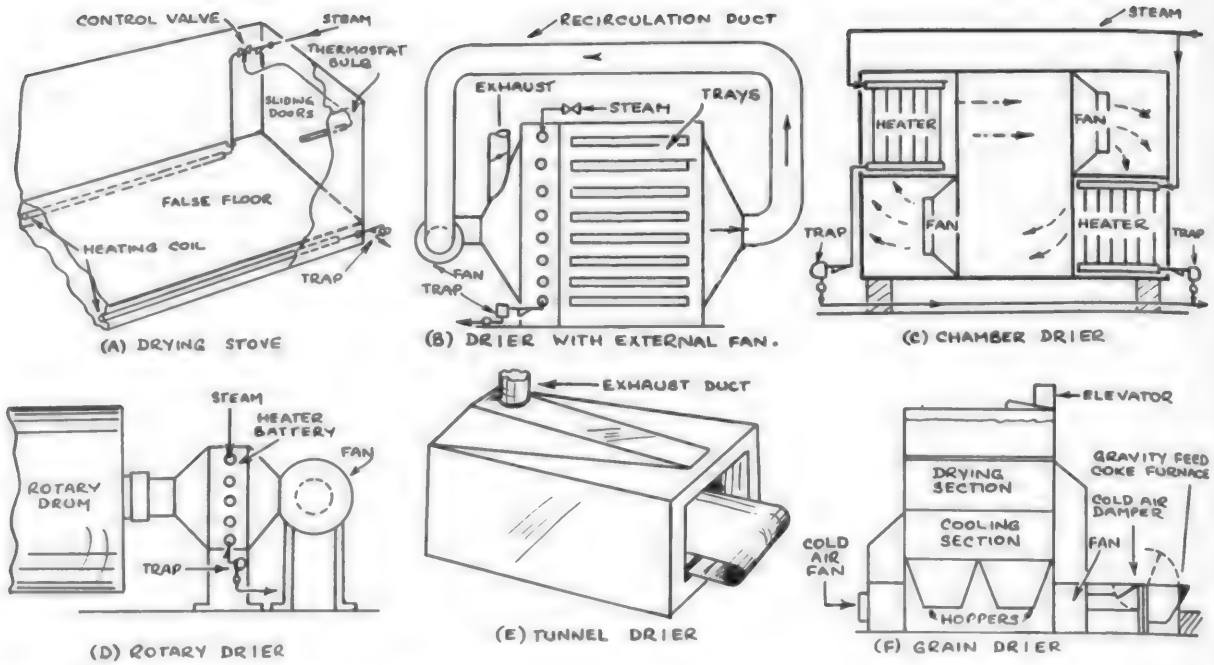

Fig. 1. Various types of drying plant for food.

lation between output of dried material and heat consumption. Considering heat input, consumption of power for air movement and/or for movement of the goods to be dried, the energy put into a drier in these forms, and comparison with the energy required to evaporate moisture will give an indication of overall drier efficiency.

Where a hot air drier is operated at excessive fan speed, power is obviously wasted to no useful purpose. Where, on the other hand, the humid air is not carried away quickly enough by an adequate exhaust fan, time is obviously wasted. Should it be necessary to operate a cylinder drier at lower speed than permissible and desirable, due to lack of efficient steam trapping and air venting of the steam-heated cylinders, the thermal drier efficiency and output will be unnecessarily low. The most efficient drier design will work far below its rated efficiency if working conditions are unfavourable. Change of manufacturing methods, installation of an intermittent heavy steam consumer in an adjacent works department fed from the same steam supply mains as the drier, might cause periodical steam starvation with consequent erratic drier output. What should be realised is that a drying apparatus possesses not only internal characteristics, inherent to the drier design, but also external characteristics, depending on working conditions, which latter may influence drying efficiency to a much greater extent than the former.

Factors for Drier Efficiency

Ordinarily, drying refers to removal of water from a solid material when the moisture content is relatively small. It may be higher in semi-solid, pasty substances, and much more for liquid solutions of solid particles suspended in the liquid, which require evaporation by means of heat for their separation. Cylinder drying machines use a sucking effect by absorption of water by means of the surrounding air of the vapour from the cylinder surfaces. Hot air driers use evaporation, preferably preceded by mechanical squeezing out of moisture in a pre-drying operation. Open-air drying is sometimes carried out.

When dealing with drier efficiency and means of improving such efficiency in existing industrial driers, it will be assumed that steam is the heating medium. The usual way of expressing drying cost in general is to compare output per unit cost with some maximum figure. The user of a drier is naturally mainly concerned with the cost of drying; this, however, gives no real indication of the relative efficiency of a machine, *i.e.* the ratio of input of energy to output of energy. The costing figure "lb. of steam per lb. of dried product" is somewhat vague as to the relative thermal efficiency of a machine. A better yardstick would be a figure giving "lb. of steam per lb. of moisture evaporated," because it takes the amount of moisture content into consideration. This steam consumption figure per lb. evaporated moisture can be calculated from the weight of dried product per hour, from the difference of percentage moisture before and after drying, and from the average steam consumption in lb./hour. If A = % before drying of moisture, B = % after drying of moisture, C = the weight of dried material in lb./hour, and D = steam in lb./hour, the weight of "bone dry" material will be:

$$E = \frac{100-B}{100} \times C$$

The weight of moisture evaporated per hour will be:

$$F = \frac{A}{(100-A)} \times E \text{ in lb.},$$

and steam consumption:

$$S = \frac{D}{F} \text{ in lb. of steam per lb. moisture evaporated.}$$

The figure S, based on steam consumption, is also a much better figure than the usually quoted figure of "lb. of coal burnt per lb. of dry work output." This latter figure does not take into account the calorific value of the coal. The ideal figure would be "B.Th.U. per lb. output of dry work."

Another point to be considered for drier efficiency is loading. Partial loading of any type of drier, whether batch or continuous, brings down thermal efficiency, as do frequent stoppages of conveyor driers. Although it is obvious that a drier has been calculated and designed for full load, irregular loading is often encountered in practice, with the result that overloaded driers require longer time for the same output with resulting larger heat losses; underloaded driers waste heat by using more hot air or steam than necessary.

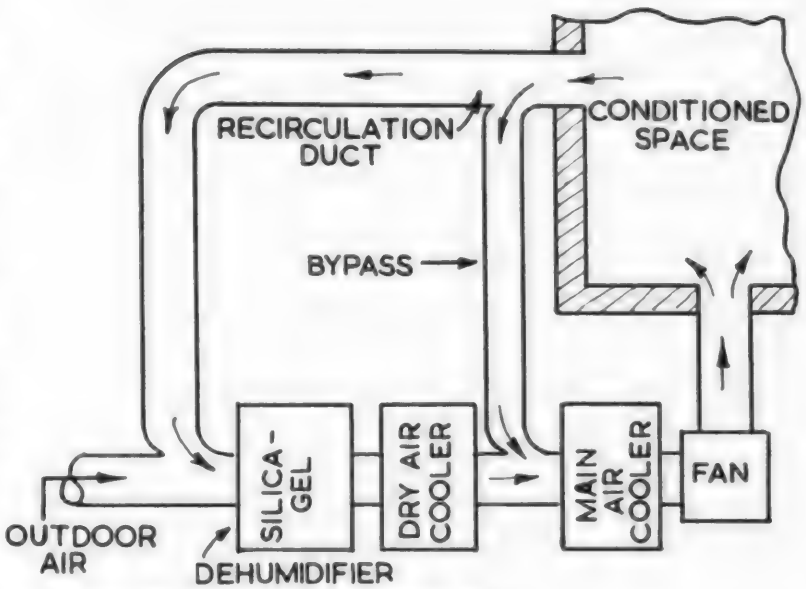

Fig. 2. Dehumidification plant for air, using silica gel.

Operation of Drying Equipment

The practical operation of a drier should closely follow the intentions of the designer of the plant, provided the apparatus is being used for the purpose and under conditions for which it has been ordered. This is, however, not always the case—for example, where a drying apparatus has been "home-made" or bought second-hand.

It also sometimes happens that a drier has been installed for a certain product, but production has changed over to another product, followed by a switching over of the drier to new working conditions, without much investigation whether the apparatus is really suitable.

Types of Driers

It is not always easy to decide which drier type should replace an obsolete piece of equipment. Drier design is rather influenced by the price of the complete plant than by the required rate of drying, and also by the total time taken to bring the moisture content of the material down. Low first costs have usually to be paid for by higher running costs, and a high rate of drying might sometimes endanger the quality and flavour of the product. As a tentative ruling, long drying periods may be best performed in cabinet driers, although the same product could be dried in a slowly moving tunnel drier, as often performed in the U.S.A., where batch drying is being replaced more and more by continuous drying apparatus. Shorter drying times lend themselves readily to the use of conveyor driers, cylinder driers, or spray driers, as the case may be.

Air and Surface Temperatures

An important point, which requires consideration for the drying of foodstuffs, is the need for lower air temperatures or lower cylinder surface temperatures. This produces the consequent movement of larger air volumes at moderate speed, or the use of vacuum for roller or spray driers. It also requires controlled relative humidity of air, and controlled moisture content of the wet product. Although it is obvious that hot air drying requires that fresh warmed air particles are continuously brought into contact with the goods, this point is sometimes neglected in drying rooms, or in drying stoves, where air circulation is imperfect, leaving "dead corners" with more or less stale air in operation. It is not surprising that uneven drying results, and prolonged drying is needed to "give the wetter particles a chance to dry." This is wrong and should not be tolerated, and where bad distribution of hot air is obviously the cause of bad output, the only remedy is to improve by means of baffling, or by installing an additional fan and/or heating surface, and the like. Uneven temperature distribution might also cause discoloration of part of the goods or a lowering of quality of some material, which in the end might reduce quality of the whole batch with consequent losses in sales price. Where the desire is present in a works to dry at top efficiency, ways and means can nearly always be found to improve drier operation.

(*To be continued*)

BOOKS RECEIVED

Orders for any of the books listed below or reviewed in this issue may be placed with the Books Department, FOOD MANUFACTURE, *17, Stratford Place, London, W.1. It is regretted that under present conditions it is not always possible to supply books by return of post.*

The Industrial Chemistry of the Fats and Waxes. By T. P. Hilditch, D.Sc.(Lond.), F.R.I.C., F.R.S. Third Edition. Pp. 604+xi. Baillière, Tindall and Cox, London. Price 27s. 6d. net.

The Master Dictionary of Food and Cookery and Menu Translator. By Henry Smith, F.H.C.I. Pp. 263+vi. Practical Press, London. Price 10s. 6d. net.

Ministry of Food

LATEST STATUTORY INSTRUMENTS

The list given below is the continuation of the list of Instruments published in "Food Manufacture," February 1, 1950, page 52.

No.	*Date 1950*	PRICE FIXATION
2407	Jan. 1.	Order revoking the Pearl Barley (Control and Maximum Prices) (No. 2) Order, 1943.
53	,, 15.	The Milk (Great Britain) (General Licence) Order, 1950. Revokes S.I. 1949, No. 2040.
87	,, 22.	Order amending the Flour Confectionery (Control and Maximum Prices) Order, 1946.
58	,, 29.	Order amending the Soap (Maximum Retail Prices) Order, 1947.
		APPLES
	1949	
2435	Dec. 31.	Order amending the Imported Apples Order, 1948.
2439	,, 31.	Order amending the Home-grown Apples Order, 1949.
		BANANAS
2434	Dec. 31.	Order amending the Bananas Order, 1948.
		CITRUS FRUIT
2433	Dec. 31.	Order amending the Citrus Fruit Order, 1945.
		DRIED FRUITS
	1950	
2366	Jan. 1.	The Dried Fruits Order, 1949. Revokes S.I. 1948, Nos. 64 and 2806; 1949, Nos. 1513 and 2034.
		DRYING OF VEGETABLES
7	Jan. 8.	Order revoking the Drying of Vegetables (Licensing and Control) Order, 1941.
		FISH
	1949	
1935	Nov. 1.	Order revoking the Fish (Supplies to Catering Establishments) Order, 1943, and the Order dated April 6, 1946, suspending the said Order.
		FRUIT
2083	Nov. 18.	Order amending the Imported Apples Order, 1948. Revokes S.I. 1949, No. 734.
2086	,, 18.	Order amending the Imported Deciduous Fruit Order, 1947. Revokes S.I. 1948, No. 2533.
		ICE CREAM
2226	Dec. 4.	Order revoking the Ice Cream (Transport) Order, 1945.

No.	*Date 1949*	LICENSING
2241	Dec. 11.	The Food (Licensing of Wholesalers) Order, 1949. Revokes S.R. & O. 1943, No. 1769; 1945, No. 410; 1946, No. 1729; 1947, No. 2420; S.I. 1948, No. 2235.
		MACARONI
1943	Oct. 28.	The Macaroni and Similar Products Order, 1949. Revokes S.R. & O. 1947, No. 1910.
		MEALS IN ESTABLISHMENTS
2183	Dec. 19.	The Establishments (Christmas Turkeys) Order, 1949.
		OILS AND FATS
	1950	
2291	Jan. 1.	The Oils and Fats (No. 2) Order, 1949. Revokes S.I. 1949, No. 894.
		POINTS RATIONING
	1949	
2046	Nov. 6.	Order amending the Food (Points Rationing) Order, 1949.
	1950	
2444	Jan. 1.	Order amending the Food (Points Rationing) Order, 1949.
		POTATOES
	1949	
2134.	Nov. 28.	Order amending the Ware Potatoes (1949 Crop) (No. 2) Order, 1949.
2278	Dec. 11.	Order revoking the Ware Potatoes (1949 Crop) (Restrictions on Sales) Order, 1949.
		RATIONING
2047	Nov. 6.	Order amending the Sugar (Rationing) Order, 1949.
2048	,, 6.	Order amending the Fats, Cheese, and Tea (Rationing) Order, 1949.
2119	,, 20.	Order amending the Bacon (Rationing) Order, 1949.
2180	Dec. 4.	Order amending the Fats, Cheese, and Tea (Rationing) Order, 1949.
2181	,, 4.	The Christmas and New Year Food Directions, 1949.
2182	Nov. 27.	The Food Rationing (General Licence No. 3) Order, 1949.
2246	Dec. 4.	The Food Rationing (General Licence No. 4) Order, 1949.
2260	,, 21.	The Feedingstuffs (Rationing) (General Licence) Order, 1949.
2346	,, 18.	Order amending the Fats, Cheese, and Tea (Rationing) Order, 1949.
		WELFARE FOODS
1902	Oct. 16.	Order amending the Welfare Foods Order, 1947.

Bakery Techniques in America and Canada

J. B. M. COPPOCK, B.Sc., Ph.D., F.R.I.C.

During a recent visit to America and Canada the author visited bread, cake, and biscuit production units in New York, Chicago, and Toronto; spent four days at the American Baking Industry's exposition at Atlantic City; visited many scientific laboratories in bakeries, shortening manufacturers, and flour mills; and spent as much time as possible with the American Food and Drug Administration in Washington.

AN OVERALL impression that can be applied to each section of the industry is that the British baker has little to learn regarding craftsmanship but quite a lot to learn in using mechanical methods. He needs to profit, however, by American experience in such a way that his products do not suffer as theirs undoubtedly have done, except in the case of the home or small bakers, by excessive mechanisation.

There are many places in which time can be saved and productivity increased by using simple mechanical bakery aids, and there are simple ones which can be just as useful to the small baker as the more highly mechanised aids may be to the larger and plant baker. For instance, America has large-scale wrapping and slicing machinery for bread, but there is also available for the smaller baker a simple slicing arrangement which can be placed on the counter and slices the loaf at the time of purchase.

White flour, 72 per cent. extraction, is enriched in America with thiamine, riboflavin, nicotinic acid, and iron. The tendency now seems for this to be done directly at the flour mill for plant bakery use, although some of the small bakers still add enrichment wafers in appropriate quantity to the mix.

A wide variety of ovens from travelling ovens to small rotary ovens, oil, gas, and electrically heated, were seen in use. The trend seems to be away from the type of oven commonly used in Great Britain. Rotary swing tray ovens, with trays of expanded metal (steel) adequately stabilised, and suitable for bread or confectionery, were much in evidence. Ovens with a circular rotating sole of steel were also seen frequently, and in both cases the avoidance of hot spots was most noticeable, together with ease of loading and unloading without the need of the conventional peel. In this way it was claimed that much conservation of space was obtained — a difficulty which besets the American baker as much as his British counterpart.

The American commercial bread is totally unlike the British product, and more closely resembles a Yorkshire teacake in texture. The small bakeries make bread similar to the British loaf and recently a firm in

A miller checks the grinding machine to make sure the mix is flowing correctly.

New York has started producing a loaf still more like it; this is finding considerable sale. The quality of American bread is chiefly controlled by the quest for softness which some bakers claim is the consequence of wrapping and slicing. Although this extreme desire for softness is deprecated by many bakers and has produced a situation from which some of them would like to escape, none of them has yet found the method.

Standardisation of Formulae

There is little difference between American bread bought in Chicago, Washington, New York, or elsewhere. The formulae have been largely standardised and the author feels that this will ultimately operate against bread sales in America. It must be remembered, too, that the plant manufacturer's bread in America is very largely sold through the grocer and competes with all the other cereal products on the grocer's shelf. At present the tendency is to produce what is known as the 6-8-6 type of bread, *i.e.* containing 6 per cent. dried non-fat milk solids, 8 per cent. sugar, and 6 per cent. shortening.

The bread most closely resembling English bread was made in a plant bakery and contained 3 per cent. dried non-fat milk solids, 3 per cent. total shortening including ½ per cent. of commercial glyceryl monostearate (45 per cent. mono- and 45 per cent. di-stearate) expressed on the flour weight, and 7 per cent. sugar. High speed mixing, which appears to be the normal practice, was used, as were sponge doughs, 75 per cent. of the flour going into the sponge and 25 per cent. into the final dough. The dough was not as tight as that in a British bakery before dividing, baking times were reduced to twenty-four minutes at 430° F. to maintain softness, and the dough scaled at 20 oz., giving a loaf weighing 18 oz. and 10 to 10½ in. long. From this it can be clearly seen the final product was very much less dense than the British loaf. On this plant, wrapping and slicing were carried out after cooling for one hour to 95° F. Rye bread was wrapped and sliced at a temperature of 87° F.

Control Instruments

There were various instruments used in the control of the mixing process; in one case an electronic device called the Mixatron was utilised, which reproduced a curve on a recorder from the shape of which dough characteristics could be related to correct water absorption and omission of salt noted from the shape of the curve. A simple and less expensive instrument consisted of an ammeter, which measured in much the same way the resistance of the mixer to the dough and was capable of giving similar information.

It was pleasing to see that in the interests of hygiene many of the canvas type proving bags had been replaced either by aluminium containers or polythene plastic trays, both of which were apparently serviceable in use, were easy to keep clean, and did not gather moulds and other extraneous materials to the same extent as the canvas or cloth bag.

Bread Softeners

Many kinds of bread softeners are in use in America, including commercial glyceryl monostearate. Polyoxyethylene stearate, sorbitol stearate, and mannitol stearate, either singly or admixed, are also used and many other related compounds have been considered. The American Bread Hearings have now concluded and the submissions and counter-submissions regarding the effect of these substances on bread, on nutrition, and on health are under review by the Food and Drug Administration.

Until considerably more is known about their effects on the human being, these products should not be used.

In the use of any materials of this type in baking it is becoming increasingly noticeable that the American authorities are also viewing the effect that replacement of ingredients such as fat by synthetic glycerides is nutritionally open to suspicion, although their use as additives to improve, for example, emulsifying power to a normal quantity of shortening would not be open to the same objection.

Anti-mould Agents

The American laws allow the use of anti-mould agents such as calcium propionate and sodium diacetate in baked products. The usage of the former in bread is approximately at the rate of 9 oz. to the sack. In some places calcium propionate was used in the summer months only for rope and mould control. At present the use of these materials is not permitted in Great Britain, but no evidence has been found of any harm that might come to the consumer from their use.

A conveyor belt carries the flour from the despatch department for deliveries to bakeries and ports of shipment.

Silicones in Bread Baking

At the Bakery Exposition at Atlantic City the impression was gained that conventional tin greasing had entirely replaced the use of silicones in bread baking. Investigations at bakeries, however, altered this view, and it appeared that many concerns were experimenting to find the best method of use and some were, in fact, using them with great success. One firm was obtaining 300 bakes without further treatment and, among other points, success was stated to be due to careful control of temperature and humidity in the final proof box; *e.g.* if the wet bulb temperature was 94° F. then a difference of 10° to 12° in the dry bulb temperature was advocated; three small holes $\frac{3}{16}$ in. were drilled in the base of the tins and it appeared important to use tins warmed to 105° F. during panning to avoid sticking at the corners.

Cleaning and Re-siliconing

Rolls were also baked on silicone-treated sheets, twenty-four rolls to the sheet, and the sheets had not required renewal of the coating for a year.

Cleaning and re-siliconing were done by a service firm and two preparations are now on the market which have facilitated the cleaning process, both being organic solvents, one a glycol and the other a chlorinated hydro-carbon containing suitable quantities of alkali.

Cake Production

There seemed little doubt that the variety of cake to which we are accustomed was not in any real evidence in America, although in Canada both variety and quality were nearer to home production. The quality of decorated cakes in America was poor and their craftsmanship inferior to the British product, although some allowance must be made on account of difficulties arising from climatic conditions.

Fruit cakes, more closely resembling puddings, contained in some cases up to 70 per cent. of fruit and nuts and the eating was such that small quantities were satisfying.

There were, however, many improvements in cake mixers, one particular model incorporating a mechanical scraper moving along the mixing bowl sides more slowly and in the opposite direction to the beater. Mechanical aids for transporting mixing bowls were many, particularly for the larger production models. A pressure mixer consisting of a pre-mixer, intermediate holding vessel for the batter, and a pressure mixer delivering to a depositor was a model worthy of note; this provided a continuous mixing operation, thus increasing productivity.

Cakes were invariably wrapped, usually in transparent wrapping material, and heat-sealed in the conventional manner. One particularly neat continuous production unit baked a chocolate sponge about 9 in. in diameter, which was then split and each half picked up from a continuous belt by two girl operators, given a smear of marshmallow cream, folded over, placed back on the moving belt and so to the automatic wrapping device.

In certain bakeries cakes weighing a pound or more were baked in rotating circular sole ovens or rotary swing tray ovens, the batter being placed directly in waxed paper or cardboard cartons at baking temperatures of 370° F. without any apparent deterioration in the container. Disposable aluminium cartons were also being introduced for the same purpose.

Use of Methyl Cellulose

Methyl cellulose is being used in America in ways similar to those suggested in Great Britain for various types of fillings, etc. There

Loaves of bread are pulled from the oven of a laboratory bakery in one of America's flour mills.

is so far no evidence to show that this material is likely to be harmful, although it has probably no nutritional value as it appears to be 100 per cent. excreted in the faeces. Methyl groups do not split off during ingestion and there is no trace of formaldehyde in the urine.

Biscuit Manufacture

The impression was formed that the American cookie had usually more "eye-appeal" and less flavour than the British product, unless flavour was deliberately added, when the quantity added appeared excessive to the British palate. The production methods used followed the conventional lines adopted by British producers and much of the machinery had originated from the U.K. High speed mixing was in evidence and non-water-cooled mixers were noted, cooling being obtained by the addition of flaked ice. In general the speed of cutting the biscuit dough and speed of the travelling band through the oven was some 20 per cent. to 30 per cent. faster than in Great Britain, but the impression was given that increased speeds tended to lower quality.

Among the mechanical aids was a depositor of the drop type, delivering batter for a sponge biscuit, which could be swung from one travelling oven to the adjacent one by a circular track on the floor. There were simple mechanical aids for bunching biscuits designed to assist the operative in packaging, and a scoop which picked up the exact number of biscuits so that the operative placed a bag round the scoop, released the biscuits into the bag, and followed up by heat sealing in a series of simple operations. Few biscuits were tinned but were mainly put up in transparent or other types of packaging material.

Testing for Rancidity

An important point arising from the use of transparent packs of this type is the necessity in any testing for rancidity development to include in the accelerated incubation tests the effect of ultra-violet light also, as light has in these circumstances an important effect.

Use of Antioxidants

In his shortening the American biscuit manufacturer makes full use of antioxidants which cannot be used in Great Britain owing to the Preservative Regulations. One such commercial antioxidant mixture used to the extent of 0·05 per cent. in the shortening (which appears to be hydrogenated coconut oil for preference) contains 20 per cent. butylated hydroxyanisole (20 per cent. solution), 70 per cent. propylene glycol, 6 per cent. propyl gallate, and 4 per cent. citric acid; in some cases 0·1 per cent. of nordihydroguaiaretic acid is used in the lard. The evidence in favour of the harmlessness of these substances in the amounts used tends to show that propyl gallate is probably the most safe, very closely followed by the anisole compounds, and N.D.G.A.

Prepacked Mixes

Prepacked mixes sold directly for domestic consumption and which require only the addition of water or milk, tinning, and baking are causing some concern to the American baker, and were it not for existing controls would be giving the British baker similar cause for thought. A wide variety of such mixes, ranging from those designed to yield small goods to cakes in many forms, is marketed. A typical cake mix contains special cake flour, sugar, salt, baking powder, dry milk, eggs, pure vegetable shortening, and flavouring. Special methods of drying flour to about 10 per cent. moisture content have been devised together with new developments in the technique of admixing the other ingredients.

New Bakery Products

It may well be that these mixes will ultimately find their way into the bakery more than into domestic use. At present, however, the American baking industry is developing an answer to this form of competition in addition to refrigerated goods. This is what is known as the Brown-N-Serve rolls and cakes. For example, the baker himself bakes a yeast-raised product to the point of rigidity and full volume but without crust colour. This product is then wrapped and sold to the housewife, who does the browning. Such products save cost to the baker as they require shorter baking times and oven temperatures of 275° to 300° F. They use a formula in which dough development and oven spring are somewhat retarded and the wrapped product is

(*Concluded on page 114*)

Fluorine in Foods

THE importance of fluorine in preventive dentistry is now acknowledged. Current interest centres on the presence or addition of fluorides in drinking water, and tends to obscure the fact that foods also furnish dietary fluorine.

F. J. McClure has recently reviewed the distribution of fluorine in foods (*Public Heath Reports*, **64**, 1061, 1949) and states that sea foods contain more fluorine than any other food except tea. Sea water may contain 1·2 to 1·4 p.p.m. fluorine and is the source of that element in sea foods.

The fluorine content of cow's milk is not affected by the fluoride content of the cow's ration of drinking water; the normal fluorine value for milk is 0·1 to 0·2 p.p.m.

Tea is very high in fluorine; 75 per cent. or more of this is extracted by boiling water. The fluoride content of citrus fruits, based on the fresh or edible portion, is less than 0·10 p.p.m.

The common cereals have been extensively analysed for fluorine. The results are variable, but in general are extremely low, of the order of 0·10 or 0·20 p.p.m. or less in the fresh material.

Most vegetables range in fluorine content from 0·10 to 0·80 p.p.m. on a fresh weight basis.

With the exception of certain roots and tubers, the fluorine content of vegetables is not readily affected by its contents in the soil and local water supply. Fluorine may, however, be increased in foods cooked in waters rich in fluorine.

In general, the natural fluorine of fish, tea, and other foods is readily available for assimilation. McClure estimates that the total food-borne fluorine, exclusive of drinking water, in the diets of children from 1 to 12 years old is of the order of 0·25 to 0·30 mg. daily. This has been checked by analyses of urinary fluorine in various widely scattered areas of the United States where the drinking water contained only traces of fluorides. A daily excretion of 0·20 to 0·30 p.p.m. fluorine was found, indicating a uniform content of fluorine in average daily diets, regardless of locality.

For purposes of dental health, it appears that during formative tooth life the average child's diet should contain an additional dental optimum supplement of a fluoride equivalent to about 1·00 mg. of fluorine daily. (*Nutritional Observatory.*)

Apple Storage

AFTER summarising the work carried out before 1947 by the Food Investigation Organisation on skin coatings or "apple dips," a recently published report* describes a large-scale trial at a commercial store. Fifty tons of Cox's Orange Pippin apples were sprayed under various conditions with an oil-water emulsion by a machine specially developed for the purpose, and then stored at 40° F.

The coated fruit retained its colour, turgidity, and freshness considerably longer than untreated fruit and also showed appreciably less fungal rotting and loss in weight. Certain of the treatments, however, produced alcoholic disorders which are symptomatic of a too high internal concentration of carbon dioxide and, more particularly, a too low concentration of oxygen.

Factors which influenced the storage behaviour of the coated fruit were: maturity and temperature of the fruit when the coating was applied; degree of emulsification of the coating; and the concentration of oil in the coating. Measurement of the internal gas composition of the fruit showed that the effect of at least the last three of these factors could be correlated with their influence on the concentration of carbon dioxide and oxygen within the fruit. The onset of alcoholic disorders was always associated with a low oxygen-tension within the fruit.

Considerable variation from fruit to fruit within a treatment was noted in both storage behaviour and internal gas composition.

* *Food Investigation Technical Paper No. 1.* "The Storage of Apples, Interim Report on Skin Coatings." Pp. 27+iii. Published for the D.S.I.R. by H.M.S.O. Price 9d. net.

Our Contemporaries

ALL industries which use metallic products in any form are affected by corrosion. There are many methods of achieving permanent protection against this, but today there is a vast industrial sector concerned with temporary protection of metal parts, machinery, plant, etc., during storage and transit. In this field, which is closely connected with packaging, plastics are now playing a significant part. The use of polyvinyl copolymers, ethyl cellulose, and cellulose acetobutyrate as temporary protective coatings is discussed in the article "Plastics *versus* Corrosion" in the January issue of *International Chemical Engineering and Process Industries*.

The February issue of this journal contains an informative article on oils and fats. In this are described the economic background of world supplies, improvements in oil extraction techniques, and developments in the different types of plant used in the deodorising and hydrogenation processes.

A description of the production of fluorescent salts is also contained in this issue.

Although the basic principles underlying sterilisation processes are well known, difficulty is often experienced by many workers in the application of these principles, particularly when large-scale production is required. In an article entitled "The Technique of Bulk Sterilisation," published in the January issue of the *Manufacturing Chemist*, Mr. S. J. Hopkins describes the recommended technique stage by stage.

An article dealing with the modernisation of Malaya's pineapple industry is included in the February issue of *World Crops*. In the same issue are described insecticidal "smoke" generators and their use. This method for the control of insects infesting stored crops is becoming increasingly popular owing to its simplicity and cheapness since no expensive equipment is required.

TO AUTHORS

FOOD MANUFACTURE is prepared to consider the publication of any books on scientific and technical subjects which authors might care to submit.

Cereal Seed and its Selection

An interesting and comprehensive little volume* in its second edition dealing with many aspects of cereal seeds has recently been published by the Institute of Corn and Agricultural Merchants in conjunction with the Seeds Committee (the successor to the Cereal Seeds Committee) of the National Association of Corn and Agricultural Merchants.

There are some 5,500 species of wild grasses growing in the world, and of these, probably the first to be cultivated for human food were wheat and barley—when, exactly, is not known, but the cultivation of wheat must have started in England before 2000 B.C., as is indicated by the discovery of wheat grains and handstone mills in British neolithic sites.

Production of New Varieties

The cereal seed merchant must have considerable technical knowledge, practical farming ability, and experience of the results obtained by growers in the districts where he operates. The production of new cereal varieties is a highly scientific job, and since Sir H. H. Biffen discovered forty-five years ago that the quality of strength or weakness in wheat followed Mendel's "laws," great strides have been made. Biffen himself introduced the well-known Little Joss—still a popular favourite wheat—and later, the strong Yeoman wheat.

It was thought originally that Mendel's principles could be used almost at will and any varieties produced according to plan. This does not work out in practice, because the hybrids produced take a long time to fix to type and there is always the risk of reversion to the qualities of one or other of the parents.

In selecting cereal seeds a number of factors must be considered, and the increase in the number of combine harvesters in this country has created fresh problems. Combined wheat has usually a very high moisture content; this necessitates the use of driers, and great harm may result from any faulty drying.

Much research is being carried out on drying methods. Some merchants employ kiln drying, which is rather hit-or-miss, but the use of more scientific slow drying methods is becoming more general. The maximum air temperature to dry wheat for milling is 150° F., but for seed purposes 120° F. is high enough. For safe storage in bulk, wheat should be dried to less than 15 per cent. moisture.

Another development is the treatment of corn seeds against such diseases as bunt and rust. Dilute copper sulphate solution has been used for a long time but has the disadvantage of wetting the grain, and now organic compounds of mercury are being increasingly used. These mercury dusts are very effective in the prevention of the spread of bunt. For seed purposes, the grains must be absolutely dry, as the germination properties of damp grain are reduced and even a complete crop failure may result.

Choice of Variety

Experience has shown that great care must be exercised in the choice of variety, and some factors involved are type of land, climatic conditions and altitude, fertility of land, and methods of harvesting. In any experimental plots, these factors must be given full consideration.

A considerable section of the booklet is devoted to notes on varieties (winter and spring) of wheat, oats, and barley. In the development of new varieties the combined interests of the farmer and the miller should be taken into consideration.

Some wheats are notoriously heavy croppers giving high yields per acre, but often in the case of these big croppers the quality of the wheat is poor from a milling point of view. This is particularly so in the case of Bersee wheat, a hybrid developed by Blondeau in France. Owing to high cropping yield, it has been grown increasingly in England and is becoming more and more unpopular among millers. There are others of these high yielding poor flour wheat hybrids, such as Jubilegem, Scandia, Vilmorim, etc., which are not suitable for breadmaking or for biscuits.

Position of the Farmer

As matters are at present, the farmer is in a difficult position. He is paid according to weight of wheat and not quality; therefore no one can blame him for growing the higher cropping wheats on this commercial basis. In the Wheat Acts of 1934 and 1937, some consideration was given to quality, as the amount of subsidy a farmer received for his wheat bore a relationship to the *average* selling price of wheat throughout the season, and a farmer growing bad wheats which brought a lower price consequently suffered.

There seems to be no doubt that more encouragement should be given to the farmer to produce better flour quality wheats instead of high yielding wheats, and the only way to do this is by putting a premium on the best milling wheats which will make it worth his while to grow them. If such a situation arose, the information and experience accumulated by the Institute of Corn and Agricultural Merchants would be of enormous value, and doubtless we should see a succession of informatory booklets such as the one now discussed.—T. H. F.

* *Cereal Seed*. Published jointly by the Institute of Corn and Agricultural Merchants and the Seeds Committee of the National Association of Corn and Agricultural Merchants. Pp. 57. London. Price 2s. 6d.

Bakery Techniques in America and Canada

(*Concluded from page* 112)

stated to remain mould free for five days, although the use of such anti-mould agents as calcium propionate or sodium diacetate is advocated by some, a procedure which could not be carried out in Great Britain under present regulations.

Note.—It should be carefully borne in mind in considering the application of the production details and methods outlined that the American baked products, *e.g.* bread, differ considerably from British procedure, and their production practice, for instance, in cooling, slicing, and wrapping may well be not directly applicable to British forms of production.

Advances in Food Research

THE fulfilment of the need for co-ordination, integration, and the promotion of orderly and systematic development of scientific knowledge in the general field of food research was the aim of the first volume of a book on the subject in which it was pointed out that subject matter areas in food research fell under several headings and that it was the plan of the editors to cover intensively various phases of these areas as successive volumes appeared. The subject matter areas were: agriculture, biochemistry and histology, entomology and zoology, food acceptance, food technology and engineering, and commodities. A number of these areas are represented by the contributions in the recently published second volume.*

Spray Drying of Foods

Marked advances have been made in the engineering, design, operation, and theory of spray driers for a variety of food products such as eggs, milk, coffee, and yeast. Although some of the information pertaining to these advances has found its way into journals, much of it is generally not available.

In their review on this subject, E. Seltzer and J. T. Settelmeyer have included not only a résumé of published information, but also much of the heretofore unavailable information relating to design, operation, costs, and use for specific food products. So far as can be ascertained this is the first inclusive review of spray drying to cover engineering as well as technology.

Thermal Process Evaluation

The avoidance of over-processing in the sterilisation of preserved foods is almost as important as the necessity to adopt adequate thermal processing to avoid spoilage. Much has been written during the last few years on this subject, and great advances have been made in devices designed to ensure standard sterilising times and temperatures automatically.

C. R. Stumbo has written an excellent review of old and new methods of thermal process evaluation; the concepts of bacterial death upon which methods of process evaluation are based; factors influencing thermal resistance of bacteria in foods; and the mechanism of heat transfer and process evaluation.

Detergents in the Food Factory

Sanitation in the food industries is an ever-increasing requirement, and the quaternary ammonium compounds have come to the fore as a very important group of chemicals used as surface active agents for cleaning belts, tables, equipment, and instruments. In his review, C. G. Dunn has brought together the pertinent information on the subject.

Ion Exchange

In his review of "Ion Exchange Application by the Food Industry," G. E. Felton has presented information relative to the various types of ion exchangers, factors influencing their action, and their application to the food industry.

Studies on DDT

The wide usage of DDT in the food industries, ranging from the control of insects and flies in the dairy barn, creameries, or grain stores, to the pear and apple orchard, has necessitated the study of its effects on man, and in his review on "The Pharmacology of DDT" A. J. Lehman has collated important published and heretofore unpublished information relating to the chemistry and pharmacology of DDT; its toxicity to man; pathology; health hazards; treatment; and antidotes.

Sensory Difference Tests

M. M. Boggs and H. L. Hanson have reviewed the literature on the testing of differences in foods by selected judges, and evaluated this literature for the purpose of bringing together information for those engaged in food research. The general field of food acceptance is at present receiving considerable attention from food manufacturers. It is of importance to the food processor to know if a change in his manufacturing process has resulted in an appreciable or detectable change in his product. To determine this requires the use of difference testing procedures which, if conducted properly, will give reliable answers. The authors' review of the "Analysis of Foods by Sensory Difference Tests" summarises the literature on difference testing and includes information on procedures.

Food Flavours

The acceptability and appreciation of foods is dependent to a large extent on the occurrence and behaviour of their natural flavouring contents. Information concerning the chemistry of these compounds is very limited, and there is practically none relating to their behaviour during the processing and storage of foods. A review by J. G. Kirchner entitled "The Chemistry of Fruit and Vegetable Flavours" has brought together and integrated the material pertaining to one phase of this important area of food research.

Food Changes during Processing

T. E. Weier and C. T. Stocking, in their review "Histological Changes Induced in Fruits and Vegetables by Processing," have assembled and reviewed the outstanding work on this subject—an important one to the processors of fruits and vegetables.

Fish Preservation

The contribution of G. A. Reay and J. M. Shewan entitled "The Spoilage of Fish and its Preservation by Chilling" brings together important information relating to these problems.

The painstaking nature of the reviews and the large amount of literature covered make this book invaluable for food research workers.

* *Advances in Food Research*. Vol. II. Edited by E. M. Mrak and G. F. Stewart. Pp. 558+xiii. Academic Press, New York. Price 70s. 6d.

News from the Industry

FORTHCOMING EVENTS

Second Packaging Exhibition

The second National Packaging Exhibition is to be held in the National Hall, Olympia, from January 30 to February 9, 1951, inclusive.

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Anglo-American Sales Conference

The joint conference on sales planning for dollar markets which was announced in the December issue of FOOD MANUFACTURE is to take place on March 13 and 14 at the Connaught Rooms, Great Queen Street, London, W.C.2.

Held under the auspices of the Incorporated Sales Managers' Association and National Sales Executives (an American association), the conference will consist of two morning sessions, two luncheons at which there will be an American speaker, and two afternoon sessions.

The first speaker at every session will be the chief sales executive of a well-known American company who has evolved a particular technique in sales management. During the discussion period which follows, he will be supported by a panel of American sales executives and of British sales managers who have experience of American markets. The chairman will be Mr. James Lenton (chairman of I.S.M.A.).

A dinner will be held at the conclusion of the conference.

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Royal Institute of Chemistry

The following meetings conclude the spring programme of the London and South-eastern Counties Section of the Royal Institute of Chemistry:

Mar. 8. "Careers for Chemists." (Jointly with the Woolwich Polytechnic Scientific Society.) N. Booth, Ph.D., F.R.I.C. 6.45 p.m. at Woolwich Polytechnic, London, S.E.18.

Mar. 9. "Photographic Sensitisers." (Jointly with the West Ham Municipal College Chemical Research Club.) F. M. Hamer, M.A., Sc.D., D.Sc., F.R.I.C. 6.30 p.m. at West Ham Municipal College, Romford Road, London, E.15.

Mar. 11. Social-dance. Oak Restaurant, 18, Kensington High Street, London, W.8.

Mar. 15. "The Functions of the Chemist in a Large Industrial Organisation." J. Dewar, Ph.D., F.R.I.C. 6.30 p.m. at the Royal Institution, 21, Albemarle Street, London, W.1.

Mar. 23. "The Chemistry of Some Actinomycetic and Bacterial Antibiotics." R. Slack, B.A., D.Phil. 6.30 p.m. at the South-east Essex Technical College, Longbridge Road, Dagenham.

Mar. 25. Visit, at 2 p.m., to Dartford vegetable parchment mills, followed by tea and theatre.

Mar. 28. "Analytical Results—Some Facts and Fallacies." (Jointly with the Welwyn Garden City Scientists' Club.) E. C. Wood, Ph.D., A.R.C.S., F.R.I.C. 8 p.m. at The Cherry Tree, Welwyn Garden City.

Mar. 30. "The Production of Heat Resisting Materials by Powder Metallurgy." W. D. Jones, M.Eng., Ph.D. 6.45 p.m. at Philips Electrical, Ltd., New Road, Mitcham Junction.

Mar. 31 and Apr. 1. Anniversary meetings and annual general meetings of the Institute at Glasgow.

Apr. 13. "Brewing in Britain." (Jointly with the Luton Scientific Association.) L. R. Bishop, D.Sc., F.R.I.C. 7.30 p.m. at Kings Fare Restaurant, King Street, Luton.

Apr. 19. The Physical Chemistry of Drug Action — a symposium. (Jointly with the London Section of the S.C.I.) "Introductory Observations." Prof. Sir Cyril Hinshelwood, M.A., D.Sc., F.R.I.C., F.R.S.; "The Use of Tracer Elements in Pharmacology." Prof. F. A. Paneth, Ph.D., F.R.S.; "Ionisation: An Important Factor which is Sometimes Critical." Prof. A. Albert, Ph.D., D.Sc., F.R.I.C.; "The Effect of Spatial Factors in the Activity of Drugs." H. R. Ing, D.Phil. 3.30 p.m. in the large chemistry theatre, University College, Gower Street, London, W.C.1.

Apr. 24. "Careers for Chemists." N. Booth, Ph.D., F.R.I.C. 7 p.m. at Medway Technical College, Gardiner Street, Gillingham.

May 17. Joint meeting with the Microchemistry Group of the S.P.A. at Teddington.

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Health Congress at Eastbourne

The preliminary programme of the Health Congress, which is to be held at Eastbourne from April 24 to 28 by the Royal Sanitary Institute, contains particulars of subjects to be discussed at the fourteen meetings of sections and conferences.

For officers of public health departments, regional hospital boards, and similar bodies, subjects include industrial dermatitis, food preparing premises, with special reference to difficulties at seaside resorts, meat inspection, and the new milk regulations.

In addition, the discussion of the hygiene of food manufacture is expected to attract representatives of the food industries, analysts, and chemists, as well as members and officers of Local Authorities.

The Inaugural Meeting of the Congress will take place at 3 p.m. on Monday, April 24, in the Winter Gardens, when an official welcome will be extended by the Worshipful Mayor of Eastbourne, and an address will be given by the Right Hon. the Earl de la Warr, P.C., J.P., after his installation as President of the Congress.

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S.C.I. Nutrition Panel

The Nutrition Panel of the Food Group of the Society of Chemical Industry is holding the fourth of its meetings in "The Nation's Manufactured Foods" series on Wednesday, March 22, at 6.15 p.m. in the rooms of the Chemical Society, Burlington House, Piccadilly, London, W.1.

The subject will be "Jams and some other Spreads as Food," and a "Historical Introduction" will be given by Dr. L. E. Campbell. A paper on "Jams," by Mr. W. Birch, will be followed by one on "Meat and Fish Pastes, and other Savoury Spreads," given by Mr. R. De Giacomi, and Dr. E. R. Bransby will conclude with a paper on "Nutritive Value and Place in the Diet of these Spreads."

Further information can be obtained from the Hon. Secretary of the Nutrition Panel, Mr. L. C. Dutton, F.R.I.C., of Virol, Ltd., Hanger Lane, Ealing, W.5.

▪

Instrument Technology

A Section intended to cover the theory and practice of closed loop control systems, including servo-mechanisms, regulators, and process controllers, is being formed by the Society of Instrument Technology to augment the work of the Interdepartmental Technical Committee on servo-mechanisms, and provide facilities for the free discussion of the scientific, technical, and educational sides of the subject.

An inaugural meeting will be held on Tuesday, March 28, at 6.30 for

7 p.m., at the Royal Society of Tropical Medicine and Hygiene, Manson House, Portland Place, London, W.1., when three short papers will be read. Prof. K. A. Hayes will deal with "Servomechanisms: Recent History and Basic Theory," Dr. A. Utley will speak on "The Problem of Stabilisation," and "Problems in Control Systems which await Solution" will be discussed by Prof. A. Tustin.

All who are interested in control mechanisms and allied subjects are invited to attend. If sufficient response is obtained the inaugural meeting will be followed by a business meeting to deal with the formation of the Control Section within the framework of the Society of Instrument Technology.

1951 Health Congress

The Royal Sanitary Institute have accepted an invitation from the Corporation of Southport to hold the 1951 Health Congress in Southport, from April 23 to 27.

Exhibitions and the Dollar Drive

Sir Gerald Campbell, G.C.M.G., formerly H.M. Minister in Washington, recently accepted an invitation from the President of the Board of Trade to make a special intensive study of trade fairs and exhibitions in the U.S.A. and Canada. During his tour he is considering not only the regular fairs and exhibitions already established and open to British exporters, but also the possibility of arranging special exhibitions or display centres for British goods.

United Kingdom participation in many different kinds of exhibition has been suggested to the Board of Trade in response to the President's request for ideas for increasing dollar sales, and it is hoped that Sir Gerald's report will indicate both the type of exhibition and the regions likely to be most fruitful to exporters who choose this way of promoting interest in their particular goods.

Sir Gerald's wide knowledge of both Canada and U.S.A. coupled with this special survey will enable him to give the department and industry the best possible advice on the use of exhibitions at the present time. He will work in close touch with the United Kingdom Government's commercial representatives in North America and the Dollar Exports Board.

Manufactured from aluminium with drop-down or fixed side handles, these containers can be stacked and used for the conveyance or storage of wet or dry foods.

Aluminium Alloy Developments

The increasing use of high-purity aluminium alloys in the catering and food manufacturing industries was illustrated by the exhibits of the Warwick Production Co. at the recent Hotel, Restaurant, and Catering Exhibition.

In addition to the heavy-duty mixing bowls and boiling pots on view, a new range of pressed trays was displayed; strong, hygienic, and easy to clean, these are used throughout the food industry from chocolate manufacture to fish freezing.

Another new development was the range of circular sealed containers, strongly made with special catches for locking. They are completely air-tight and, when necessary, can be made with a pressure valve.

Tables with fitted centre cruets and stacking chairs were also on display.

Industrial Mission to Pakistan

The British Government recently accepted an invitation from the Pakistan Government to send an industrial mission to Pakistan. The mission, led by Lord Burghley, K.C.M.G., arrived in Karachi at the end of February and is spending about three weeks in Pakistan.

The other members of the mission are: The Hon. A. D. Campbell, C.B.E. (textile industry); Dr. G. I. Higson (chemical industry); Mr. E. C. Holroyde (electrical industry); Lt.-Col. Sir Cyril Jones, C.B.E. (food processing); Mr. W. J. H. Rennie (civil engineering); Mr. S. A. Wright (agricultural machinery industry); and a representative of the Trades Union Congress. Mr. W. Godfrey, the United Kingdom Senior Trade Commissioner in Pakistan, is also acting as a member of the mission *ex officio*, and Mr. M. J. Watt of the Federation of British Industries is attached to it in an advisory capacity. The secretary of the mission is Mr. J. Gray of the Board of Trade.

The mission's terms of reference are:

> To explore and report to the United Kingdom Government on the steps which might be taken to assist the flow of trade in both directions between the United Kingdom and Pakistan, and particularly on the way in which the United Kingdom industrial and commercial interest could assist further in the planning and execution of schemes which the Pakistan Government have under consideration for the economic development of their country and the expansion of its trade.

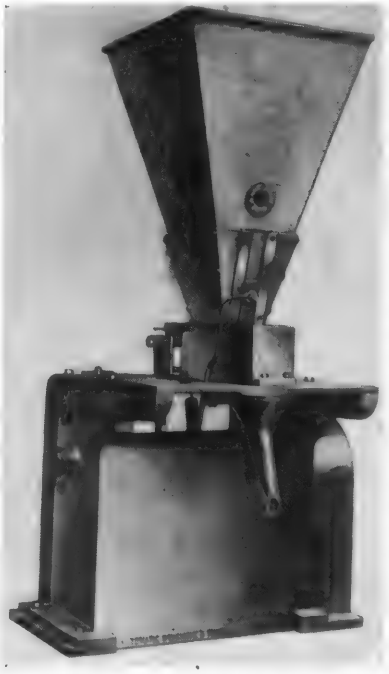
Pest Control Products

A committee has been set up by the British Standards Institution to devise simple names for pest control chemicals. These will not conflict with proprietary names.

Package Research

Visits by the director of research, Dr. G. L. Riddell, F.R.I.C., to package testing laboratories in Belgium, Holland, and France are described in a recent issue of *Patra Journal*.

A brief report is also published of tests on the grease-proofing of carton boards by use of sodium alginate, 3 per cent. to 5 per cent. solutions of which will, it is stated, provide resistance to penetration by grease. Calcium alginate is stated to be ineffective.



Volume filling machine for handling free flowing granular material.

New Volume Filling Machine

A small inspection window provided in the hopper which clearly indicates when the material is running low is an interesting feature of the slide feed type volume filling machine for handling free flowing granular material which has recently been developed by the Automatic Weighing and Packing Machine Co.

The patent feed is made so that the cut-offs are synchronised, and while the bulk feed is held back, the accurately measured quantity is released by the opening of the front slide and the quantity is discharged down the chute into the package.

The unusual shape of the measure chamber assists the speed of discharge, and allows the passage of from a few grains up to the maximum capacity; adjustments can readily be made even while the machine is in operation. The method of cut-off has been designed specially to prevent any damage to the materials while being filled.

Capable of filling up to 70 packets per minute, the machine can be set to suit the capacity of an operator where containers are fed to the discharge outlet by hand. A fitted motor drive makes the unit self-contained.

Swedish Tests on Pasteuriser

Extensive tests on the APV Paraflow were recently completed by the Swedish State Testing Station at Alnarp. In the conclusions to the report it is stated that, at a capacity of 5,000 l. of whole milk per hour and an average holding time of 19·8 seconds, a good bactericidal effect was achieved at a temperature of 68° C. or higher against tubercle bacilli, abortus bacteria, and coli bacteria. No influence on the flavour of the milk was noticed at heating temperatures up to 76° C. used during the tests, and the skimming properties of the milk treated in the machine were not unfavourably affected.

Irrespective of whether the milk had been cleaned in the integral filter or by means of the clarifier, the creaming in 24 hours was only slightly affected when the milk had been heated to the lowest temperature necessary to obtain a negative phosphatase reaction. No influence of any importance on curdling time or on whey-separating properties of the rennet coagulum could be found when 4,800 to 5,300 kg. of cheese-milk per hour were heated to 71° to 72° C.

APV Paraflow as tested at Alnarp.

Application of cold process welding.

Cold Pressure Welding

The cold pressure welding process, developed by the research laboratories of The General Electric Co., is now being used for the sealing of aluminium containers in which the firm are sending electronic tubes overseas.

The flanged container is formed from an aluminium slug by impact extrusion. After the welding faces of the flange and the disc lid have been cleaned, they are welded in one quick operation. The weld is air-tight, and the container will protect the contents from changes in atmospheric pressure and humidity.

It is possible that this application of the cold welding technique may be the forerunner of radical changes in packing methods for the products of many industries.

Food Manufacturers' Association

An association called the Free (Food) Manufacturers' Association has been formed by a group of leading manufacturers, representing makers of unrationed as well as rationed confectionery.

The chairman of the Association is Mr. D. F. Underhill, and Mr. J. Waywell has been appointed secretary.

Temporary offices have been established at the Claremont Research Laboratories, Claremont Street, N.18 (telephone: Tottenham 7857).

Food at Ideal Home Exhibition

So much interest has been shown by the public in former bread baking demonstrations that three prominent bread firms are setting up bakeries at the Ideal Home Exhibition at Olympia from March 7 to April 1.

More free tasting samples than at any time since the war will be offered, and these include sauces, salad cream, chutney, concentrated fruit squash, custards, various beverages, honey, cheeses, strained foods, soups, pickles, meat extracts, cereals, and canned and frozen fruits.

A machine shredding wheat will be shown by the Shredded Wheat Co., whose exhibit will also include illuminated colour photographs of various dishes made from their product and a working model of their factory.

Butter, mild-cured bacon, eggs, and several other Danish products are to be exhibited by the Danish agricultural producers, and visitors will be invited to taste cheese such as "Danish Blue," "Samsoe," and others.

The new ready-for-use icing in tubes—"Icette"—will be on show. The specially designed nozzle makes it easy to "write" with the icing, which can be kept for further use after replacement of the screw cap.

A new milk-based beverage, "Maralyn Milk Plus," which needs only water to make an attractive hot or cold milk drink, will be introduced by Bovril, while quick frozen fruits, vegetables, and poultry, and canned goods will be on sale at the stand of Newforge.

Fifty prizes, worth three guineas each, in the form of hampers containing pickles, essences, soups, salad cream, and other goods, will be offered by Crosse and Blackwell for solutions to their crossword competition, together with an original recipe made with their products.

Factory Extensions

As soon as the necessary plans have been approved, Farley's Infant Food propose extending their factory premises at Tor Lane, Hartley, Plymouth.

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Horrocks and Sons (Merthyr and Newport), mineral water manufacturers, are extending their factory premises at Turner Street, Newport, Mon.

▪

A. W. Neville are planning the reconstruction of their bakery premises at Harrow Road, Leyton, E.11.

▪

Thomas and Evans, mineral water manufacturers, propose the erection of a new factory at Peterborough.

An extension to their mill at Garth Lane, Grimsby, is planned by the Service Food Co.

▪

Plans for carrying out extensions to the canning department of Simpsons Ready Foods at Street Road, Urmston, have been approved.

▪

Peek Frean and Co. are to build new factory blocks to replace those destroyed by enemy action at Keetons Road, Bermondsey, London, S.E.16.

▪

Plans for extensions to their chocolate factory at Galleywell Road, Bermondsey, London, S.E.16, have been drawn up by W. S. Shuttleworth and Co.

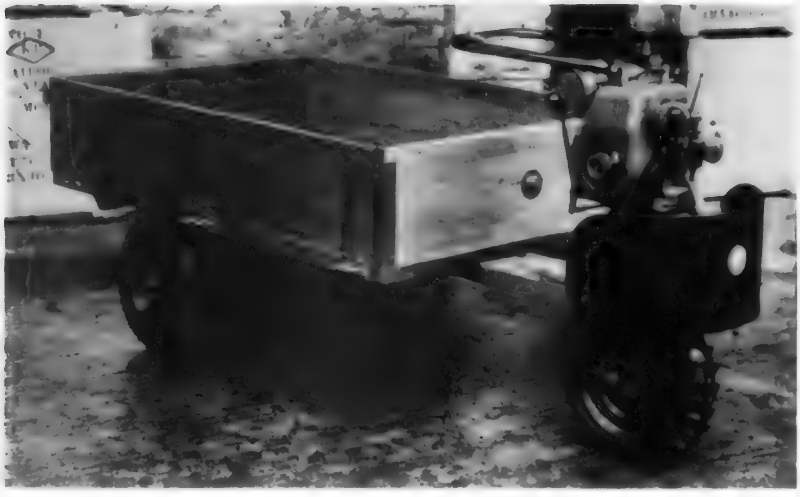
Three members of the George Ellison staff are welcomed back from the U.S.A. by the works manager, Mr. F. W. Baines. *From left to right:* **Mr. F. W. Baines, Mr. N. L. Hollins (assistant works manager), Mr. W. J. Bough (charge-hand fitter), and Mr. J. H. Weaver (production engineer).**

U.S. Visit of Control Gear Team

The difference in outlook between American manufacturers of electric starting and control gear and their counterparts in Great Britain was commented upon by three members of the staff of George Ellison who recently returned from the U.S.A. They are Mr. N. L. Hollins (assistant works manager), Mr. J. H. Weaver (production engineer), and Mr. W. J. Bough (charge-hand fitter), who have completed a six weeks' tour of factories in New York, New Jersey, Connecticut, Ohio, Pennsylvania, and Michigan as members of a productivity team representing the British electric motor starting and control gear and small air-break switchgear industry.

Americans apparently feel that U.K. manufacturers concentrate too much on obtaining long life for their products; the representatives looked in vain for the counterpart of the highly skilled British craftsman, but they found much to admire in the knowledge of the tool designers and the skill of the toolroom engineers, resulting in a far greater speed of production than was thought possible.

It was interesting to note that most of the American switch and control gear was of the air-break type in spite of the plentiful supplies of oil in that country.



" Wrigley " motor truck for internal works transport.

Internal Works Transport

The problem of providing suitable internal works transport has been simplified by the introduction of a range of motor trucks made by Wessex Industries (Poole).

Trucks of 1 h.p. have an engine unit with 3 speed gearbox, and chain drive to a 16 in. × 4 in. pneumatic tyred wheel, all carried on a ball-bearing turntable which provides a reverse movement, and gives a very small turning circle that is particularly useful in factories with narrow gangways and loading ways.

The range of body and chassis styles available includes general purpose tugs, trailers, hydraulic stillages, low loaders, and tippers with low running and maintenance costs.

The range of 3 h.p. models now being developed has a load carrying capacity of up to 1 ton, against that of 10 cwt. for the small 1 h.p. units.

Colour in Canteens

With the lamps and fittings now available, and present ideas of decoration, the old difficulties of colour distortion of foods need no longer be an obstacle in the design of canteen facilities. A good example of the joint planning of decoration and lighting is Crompton Parkinson's staff canteen.

Tests were taken to ensure that the right proportion of light from the natural coloured fluorescent tubes was reflected from the various ceiling and wall surfaces which were painted in colours selected to give the right effect on all foodstuffs.

Care has been taken to avoid direct glare to any of the occupants of the room and to provide sufficient illumination both for the consumption of food and also for recreational activities.

The finish of the panels in the fittings ensures high lighting efficiency with a soft upward glow which eliminates dense ceiling shadows and yet allows the equipment to be well maintained. The downward light is controlled by a lattice louvre, which gives a pleasant diffused effect. Below the level of the table tops, colours which would be detrimental at a higher level are widely used to provide colour contrast. Light green table tops with sycamore edges and darker green seats together with the light brown patent block floor complete the scheme.

Scottish Fruit Research Centres

A twenty-acre site in the Clyde Valley is understood to have been earmarked for the erection of a fruit research centre, mainly concerned with strawberries. Another fruit research station is being set up in the Dundee area.

These research centres have been sought for many years by practical fruit growers in the main Scottish areas and particularly by the Clyde Valley fruit growers whose crops have suffered severely from disease in recent years. While welcoming the decision to establish a station in the Clyde area, growers regard the acreage insufficient for research on strawberries, plums, and apples.

Tube Manufacture Changes Hands

The manufacture of Evolite welded perspex tubes, fittings, and cylinders has been taken over by Richard Daleman, Limited.

Scottish Oyster Problem

Although the demand for oysters remains strong in Scotland, there is no immediate prospect of reinvestment in oyster beds. Some interest has been aroused in this project recently by the success of the Hebrides co-operative scheme for lobsters, but trade opinion is against such a scheme for oysters as the development of a financially profitable oyster bed would take too long.

Biological marine experts are also disinclined to suggest that restocking the older beds would be profitable. This means that Scotland must continue to rely very largely on English oyster beds. The only oyster fishery now at work in Scotland is on Loch Ryan; other fisheries at Orkney and on Loch Fyne have been allowed to lapse, and no supplies come through, despite the fact that oysters are still in demand.

Gland Packings and Seals

A demonstration recently organised in London by Crane Packing featured gland packings, pipe jointings, and valve seatings which have been developed for use with chemicals of a highly solvent or corrosive nature.

Research had been carried out to find material with a greater degree of chemical inertness than was possessed by any known material suitable for the manufacture of gland packings, and this quality had to be combined with certain other essential characteristics if the packing were to meet all the requirements of these severe conditions.

A solution was found in a new plastic material Polytetrafluoroethylene (P.T.F.E.), a polymer containing carbon and fluorine atoms only.

The result is a range of gland packings possessing unique properties, which have been given the name C.F.2. They are chemically inert, thermally stable, non-toxic, and have good mechanical properties and a low coefficient of friction. In their solid moulded form, these gland packings meet the requirements of the most severe gland service conditions.

As a gland packing C.F.2. can be used with the following materials within the temperature range of -60° to 450° F.: inorganic acids, and all concentrations of oleum; plating solutions; caustic alkali solutions; HCl gas, SO_2, SO_3, oxides of nitrogen; all halogen gases except fluorine; and oxygen.

Truck Sales Taken Over

As from February 1, the sales of Electricar industrial trucks became the responsibility of I.T.D., who already market the Stacatruc and Aerolift fork lift trucks; the firm will henceforth be in a position to offer a complete range of industrial trucks for practically all materials-handling purposes.

Spares and service for Electricars and Stacatrucs will now be dealt with by the parent company, Austin Crompton Parkinson Electric Vehicles.

Scottish Fruit Growing Scheme

An important move has been made in the north-east of Scotland to provide an outlet for the new Moray-Firth fruit growing scheme. The premises and business of Highland Preserves at Inverness have been acquired, and jams and preserves will continue to be made under the control of the manager and his staff whose services have been retained.

In addition, the Fruit Growers' Association will construct a co-operative marketing organisation which will use the factory as a centre for collection and distribution.

Cornish Pilchard Industry

At its meeting at Truro recently, Cornwall Sea Fisheries Committee appointed a sub-committee to investigate various methods for freezing pilchards.

The chairman, Commander W. B. Luard, said that all the canned pilchards produced in Great Britain could be sold, and they were trying to enlarge canning and refrigerating facilities.

A proper system of distribution throughout the whole country was called for by Mr. J. Read, while the vice-chairman, Mr. E. G. Lilley, said the committee could not attempt the opening up of markets, which was a matter that should be left to individual enterprise.

The fishery officer, Mr. C. H. B. Richards, reported that the crisis in the pilchard industry had been averted for a while by devaluation and by a reduction in the price of pilchards paid to the fishermen at the rate of 6d. to 9d. per stone. Curers would be able, he said, to offer to Italian buyers a commodity greatly reduced in price, and it should be possible to dispose entirely of the stocks held over from last winter.

Aluminium Foil in Packaging

RECENT DEVELOPMENTS IN WRAPPING MATERIALS

When using aluminium foil as a functional material, it is usually necessary to add either a coating or some other material such as paper or transparent film, said Mr. W. A. Harrington, speaking to the Northern Branch of the Institute of Packaging at Manchester recently.

In gauges of less than one-thousandth of an inch thick, minute pin holes, through which water vapour diffuses, are to be found in the foil. With paper or film, water penetration is through the whole area, the transmission rate being dependent upon thickness and type. Combinations of foil and film reduce this transfer rate to the minimum.

When moisture must be retained within the package, foil should be on the inside, and the paper or film on the outside; to prevent the admission of moisture into the package, the positions may be reversed. In either case, the lamination must be complete, with the two materials in full contact over their whole areas.

To make full use of the impermeability of foil it is essential that the wrap be sealed. The most convenient method is by the application of a thin thermoplastic coating. Foils are now available coated with high temperature seal coating on one side and low temperature seal coating on the other side, both based on vinyl resin copolymers. On heat sealing packaging machines, this allows the formation of a heat sealed unit pack around the product, and at a later stage the securing of the sealed unit to a card or other advertisement wrapper. These thermoplastic coatings effectively protect the metal against corrosion.

The dairy industry is a very large user of aluminium foil. Butter and margarine packed in an opaque material maintain their condition and flavour considerably longer than if packed in a transparent or translucent wrapper, while processed cheese deteriorates rapidly unless packed in a material such as foil. Over 2,000 tons of foil are used annually for milk bottle capping alone. An easily removable wadded cap can now be made which will withstand internal pressure in excess of 250 lb. per sq. in.; this is being used for capping milk which is sterilised in bottle, and also as the closure for beer bottles.

Experiments are being made in Great Britain and in Scandinavia with a heavier gauge coated foil which will replace the traditional butter wrapper.

A most interesting material has recently been produced by laminating foil to foil; despite possible perforation or pin-holing in each foil, the resultant sheet is very much more ductile and dead folding than a similar thickness of aluminium in one sheet. The moisture transmission rate is practically zero, and resistance to perforation on creasing much higher than expected.

For foil and paper laminates, it is necessary to check the chloride and sulphate content and also watch for free acidity in the paper. Equilibrium moisture content in Great Britain is in the region of 7 per cent., and unless the chloride figure (expressed as chlorine) is less than ·07 per cent., corrosion of the foil will almost certainly take place. An investigation is being made into the use of inhibitors with adhesives which have already been found to have advantages.

In deep freezing plants the low thermal emissivity of the foil when on the outside of the package somewhat retards the rate of heat transfer. Where, however, the foil is laminated to a folding box board with the foil towards the product, there is no marked difference in freezing time.

Cardboard Box Team Visit U.S.A.

To examine American methods of making and using cardboard boxes and cartons, a productivity team, organised by the Anglo-American Council on Productivity, with Marshall Aid, recently left for the U.S.A. under the leadership of Mr. Douglas James, O.B.E., managing director of the Pearlite Box Co.

The team are examining the types of machines in the United States factories and noting the ways in which they are set up and used and also what labour is employed on them. Because of the insufficiency of skilled workers in the British industry, the most has to be made of unskilled labour, and the team are looking for the mechanical methods which the American factories use for handling raw materials and other work, as well as the preparation of the boxes and cartons for despatch. Incentive schemes for production and welfare schemes for the workers are other subjects of enquiry.

Appointments

Mr. T. S. Ling has joined George Scott and Son (London), and Ernest Scott and Co. as outside representative in charge of their North of England activities.

Mr. B. Graham, A.M.I.E.E.

Mr. B. Graham, A.M.I.E.E., has been appointed manager of the Birmingham and District sales office of George Ellison.

Joining the firm in 1930, Mr. Graham was transferred to their Birmingham sales office in 1933; he became an outside technical sales engineer in 1935, and in 1944 was appointed deputy manager.

Trust's Annual Report

That the investment income was slightly higher than for the previous year is mentioned in the Eighth Annual Report of the Charles Henry Foyle Trust for the year ended May 31, 1949, and there has been accumulated the sum of £11,544, representing income tax deducted from dividends and available for recovery.

An increased number of applications was received during the year which resulted in a substantial rise in expenditure. Although some have been received from as far afield as Germany and China, the majority of applications for educational grants continues to come from residents or students in Birmingham. Grants to various expeditions, and to University students for foreign travel and study have been made, and the Trust aided the University of Birmingham to send its medical officer and director of physical education to the United States to study conditions there.

Quick Freezing of Poultry

Evidence of the growing surplus of poultry and of the more general application of quick freezing in dealing with it has been demonstrated in Fraserburgh, where the firm of Fromac operate a modern quick freezing plant concentrating on the processing of table birds.

This area shares with the Orkneys the heaviest poultry population in Scotland, and while the Christmas sales normally help to clear supplies, breeders cannot afford to wait eleven months for that market.

The firm buy live table birds from the surrounding area in order to keep their modern plant fully employed; quick freezing is used essentially for glut periods, but the plant is organised to handle a very wide variety of services.

The creation of quick freezing units in all the main poultry breeding areas would seem to be a matter of time only, but the development of this process will inevitably be hampered by the limited expansion of storage and merchandising facilities at the retail end; the price factor is also important.

A New Protein Food

A new soluble protein food, one and a half ounces of which contain approximately 38 g. of protein, has recently been introduced by Glaxo Laboratories. Known as Casinal, this food is casein presented as its calcium salt and is prepared by a process of roller drying which produces a fine, odourless powder that can readily be used in invalid or everyday meals without affecting their flavour or texture.

The product is mixed with milk, water, or stock before being used in a dish; it should never be added as a dry ingredient to other dry foodstuffs or mixtures.

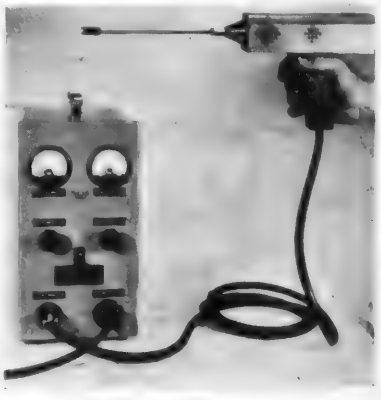
During illness or following surgical operation or accident, the inevitable nitrogen loss can be rapidly and effectively countered by including this product in the diet. Since its sodium content does not exceed 0·1 per cent., Casinal is also suitable for inclusion in "salt free" diets. Milk mixtures used for the feeding of marasmic and premature babies may be fortified by this means, and during normal infancy and childhood the use of this food ensures an adequate protein intake—a factor of particular importance in view of the restricted supply of high-protein foods such as lean meat, milk, and eggs.

Leak Testing in Refrigeration

Where Freon or methyl chloride are used as refrigerants in a system, one of the difficulties has been the location of small but nevertheless serious leaks.

With the introduction of the British Thomson-Houston Company's leak detector, minute leaks can be rapidly detected. The instrument is highly sensitive to vapours of halogen compounds and gives both a visual and audible indication of a leak as small as one at the rate of less than one-fiftieth of an ounce per year.

The instrument consists of a detector unit and a control unit. The detector is a hand-held probe with a convenient hand grip and a plastic-tipped metal nozzle. The unit contains an element sensitive to vapours of halogen compounds (those containing chlorine, bromine, iodine, and fluorine) and a motor-driven impeller which draws air through the element. A small loudspeaker built into the detector unit emits an audible clicking sound, and when the sensitive element detects the presence of vapour of a halogen compound, the frequency of the "clicking" increases; a visual indication of a leak is given by an increase in the meter reading on the control unit. The apparatus requires a 190-260 volt A.C. supply, the consumption being 150 W.



When making a detailed search, the close application of the probe of the control unit to suspected points for about a second is generally sufficient for any leak to be detected.

In addition to the testing of refrigeration systems, the detector can be used for the pressure testing of tanks, pipes, joints, and welds, the method being to pressurise the system with air carrying a small quantity of "tracer gas," such as chloroform vapour, carbon tetrachloride, or Freon.

Steel Band Conveyors

Twin cooling conveyors for sponge, twin conveyors for jars of jam, conveyors for ice cream blocks, and for cream and chocolate biscuit cooling, as well as fruit sorting tables, are among orders recently fulfilled by The Steel Band Conveyor and Engineering Co. The dense smooth surface of the cold rolled hardened and tempered charcoal steel band enables scrapers to be used, so that it can be kept clean for the handling of hot and sticky materials, while stainless steel bands are available for special requirements, both types enabling hygienic conditions to be maintained.

A patented water-bed conveyor was evolved several years ago for the cooling of materials and solidification of liquors. This consists of shallow water tanks under the band, the water pressure being just sufficient to lift the band so that it floats on the coolant. This has been applied particularly to the solidification of gelatine liquor. When a relatively thick material has to be cooled, it can be conveyed between two water-cooled conveyors.

Special attention is now being given to conveyor framework to facilitate cleaning down, and tubular constructions are frequently supplied to the food industry, the whole conveyor being mounted on wheels for portability.

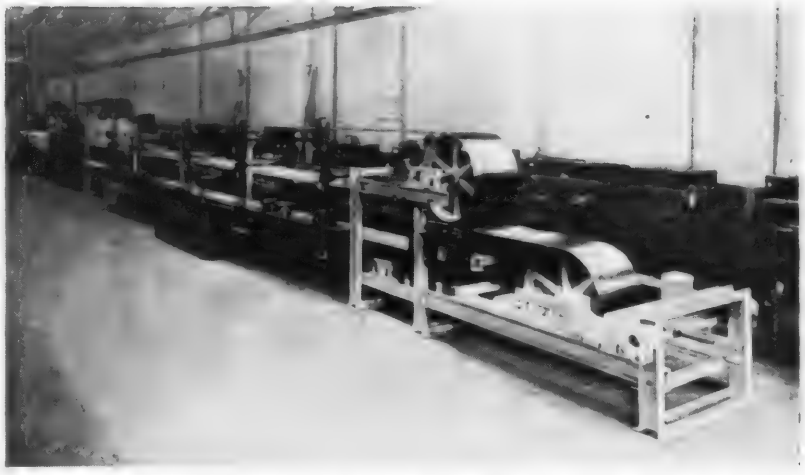
Extraction Units

Capable of delivering clean, cool air, entirely free from oil, grease, or foreign matter, the Nash Hytor compressor, manufactured by the Nash Engineering Co. (Great Britain), eliminates the need for after coolers and filters. This clean air feature is due to the scrubbing action of the water seal upon which the compressor depends for its operation and to the complete absence of internal lubrication.

Identical in design with the compressor, a vacuum pump can be furnished in single or double stage and is capable of maintaining a high vacuum for a variety of processes.

On some evaporator installations the condensing action which takes place within the pump itself avoids the need for a separate condenser.

There is only one moving part, the rotor, revolving without metallic contact. The pump shaft is supported by ball or roller bearings located externally in dust-proof housings, and metal specification can be varied to suit requirements.



Two water-cooled conveyors, the first plant of this type, designed for use in the confectionery industry.

Marking Packages for Export

A Joint Committee and Working Party is being set up by the Institute of Packaging and the Institute of Export to examine the question of methods of marking packages in foreign languages. Its objects will be to consider to what extent foreign language markings are needed, and, if necessary, to prepare for the guidance of exporters, shippers, and packers a set of markings translated into foreign languages. Problems such as the marking of net and gross weights for the guidance of both port and transport labour and customs officials, and addressing will also be reviewed.

Hygienic Handling Equipment

Manufactured from a corrosion-resisting light alloy which is not injurious to food, interstacking and non-interstacking trays for the hygienic handling of food have been designed and developed by the Heston Aircraft Company, who have recently set up an equipment division to give personal service to food manufacturers.

The strength of the trays and containers is not impaired by their lightness, and this makes them particularly suitable where female labour is used. There is no fear of screws or nails finding their way into the actual product, and the trouble of splinters as in the case of wooden containers is obviated.

The construction of the trays is such that they can be manufactured in any size without incurring high tooling costs; they can be made to customers' specific requirements and design and stress services are made available by the company.

Scotland Survives Competition

Engineering firms in Scotland specialising in machinery for tea, rice, coffee, and sugar plants are still faced with a very large number of orders, despite increased competition and the passing of the post-war boom. This business is handled by Glasgow and west of Scotland firms and by a few specialist firms on the north-east coast.

Central America, East Africa, and Iran are reported to be among the major markets; orders from coffee, rice, and sugar plantations continue to come through steadily and work is assured for a long time ahead.

In the west of Scotland firms have noted increased competition from the Continent, but the amount of work on hand guarantees continued activity throughout the year.

Meet Sam Smalls

Members of the Express Carriers Group of the Road Haulage Association are launching a campaign to bring to the attention of trade and industry the fact that smalls carriers under free enterprise are still numerous and active and are still in a position to handle the traffic offered to them.

The first step in the campaign is the distribution on a wide scale of a leaflet introducing Sam Smalls, who, it is felt, personifies the special advantages traders may confidently expect to obtain from express carriers under free enterprise. Members of the Group, numbering approximately 500, are being asked to make use of the "Sam Smalls" symbol on their letter-heading and in their own advertisements.

BOOKLETS RECEIVED

Continuous evaporators designed primarily for the manufacture of unsweetened condensed whole milk, skim milk, and whey, with modified designs for fruit juice and other potable liquids, are fully described in a recent APV brochure. All the components of the plant are dealt with and technical features are summarised. A large diagram shows the flow in a typical installation of a double effect milk evaporator.

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Stainless steel tubes in the dairy industry and for food processing and fermentation are the subject of a recent booklet designed to outline the many applications of stainless steel. Produced by T. I. (Export), this illustrated publication also gives some facts about stainless steels and deals with inter-crystalline corrosion, or "weld decay."

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Although concentrating on the modern role of ice cream as a year-round food, a 48-page brochure published by Wall's traces the development of the firm from 1786. It tells how Queen Victoria regularly sent a brougham from Buckingham Palace to the company's first shop in Jermyn Street for sausages made to a special recipe. In those days a donkey, plodding a treadmill, worked the primitive sausage-grinding machinery.

Photographs, including four-colour illustrations of ice cream and meat dishes, cover every aspect of the organisation.

▪

The important part played by nickel in ocean depth sounding equipment is demonstrated in an interesting article in a recent issue of *Wiggin Nickel Alloys*.

Shorter articles deal with the use of Monel in cannery pipelines, bottle-filling machinery, pumps, rotary vacuum filters, and electro-steam equipment. A description of the use of K Monel in reconditioning pumps for high viscosity corrosive liquids is of particular interest.

▪

Members of the dairy, brewing, food, fruit juice, and chemical trades will be interested in a new brochure which illustrates the wide range of stainless steel fabricated equipment manufactured by Burnett and Rolfe. Large-scale equipment for the dairy industry includes vats, storage tanks, processing vessels, a milk receiving dumping and balance tank, and a weigh bowl; plant for the fruit juice and brewing industries ranges from mixing and storage tanks, sugar boiling vessels, and syrup pans, to tanks for beer storage and conditioning. Illustrations of road transport tanks complete the brochure, which is the first to be issued by the organisation.

▪

A short article on the Nimonic series of alloys, and their applications where great strength at high temperature is required, appears in a recent issue of the *Nickel Bulletin*.

A gas turbine plant is featured among the illustrations in addition to curves showing creep characteristics of Nimonic 80 and Nimonic 80A; a number of interesting abstracts are also included in this bulletin.

▪

Prepared by the Joint Publicity Committee of the British Engineers' Association and the British Electrical and Allied Manufacturers' Association to aid manufacturers in assessing beforehand the factors affecting the costs of producing films, the *Guide to Industrial Film Making* not only provides comprehensive information concerning production but also includes particulars on distribution, technical film terms, etc.

▪

The first number of *Prism*, the house magazine of Brown, Bibby and Gregory, has recently been published. The factory for which the magazine is run employs 1,100 workers and the editor is one of the foremen. Attractively produced, the publication is divided into sections, with contributions from the managing director, the advertising department, and the factory workers.

▪

Intended to give the reader a clear picture of the potentialities of these sections, the Information Bulletin No. 16 of the Aluminium Development Association, entitled *Aluminium and Aluminium Alloys Extruded Sections* (*Design and Tolerances*), describes the extrusion process in principle. The bulk of the book is illustrated to show those problems which can be discussed at the design stage, and the special features and advantages of the process. Characteristics and properties of aluminium and its alloys, notes on extruded sections, and tables of tolerances are dealt with.

OBITER DICTA

• The public will be agonised to learn that nine-tenths of their bread is "agenised."—*Daily Mirror.*

• Food stores should be like an operating theatre, the last thing in cleanliness. — *Dr. F. C. Hamilton.*

• At any time the sausage is mysterious, but evidently it becomes more mysterious on examination.—*Provost Falconer, Portknockie.*

• There is no shortage of vitamins in the ordinary mixed diet of today, and there is no need for people to supplement it by buying vitamin tablets.—*Mr. D. J. T. Bagnall, Hull City Analyst.*

• I should like to thank the donor for his gift of fruit and the spirit in which it was given. —*Minister's acknowledgment in the Church Magazine of a gift of a bottle of cherry brandy.*

• Hotels will soon be able to buy turnips graded to a millimetre, but you may not be able to eat them no matter how well trained you are today in the eating line.—*Mr. R. L. Scarlett, Scottish N.F.U.*

• My father used to talk about his youth and the barley bread. Heaven knows, our bread has been bad enough, but we haven't been down to barley bread for all that.—*Mr. Ben Hinds, chairman of the Milk Marketing Board.*

• We have got the scenery, but we have not got the cooking and the tummy has a longer memory than the eye.—*Mr. W. Rees Jones, head of the Hotel and Catering Trades Department of Blackpool Technical College, on the tourist trade.*

• I see it has been humorously suggested that one of our priority imports should be Germany's Food Minister to teach us how to get food.—*Mr. H. G. Garrett, chairman of the Advisory Committee of the Imported Meat Trade Association, Inc.*

• The best cure for dirty food would be the end of rationing because the dirty shopkeeper would be put out of business and the housewife would be more "choosy."—*Mrs. Baldwin of the Central Wandsworth Branch of the British Housewives' League.*

COMPANY NEWS

Despite restrictive conditions, the group's trading profits for the year were slightly in excess of those shown by preceding accounts, it was stated by Mr. Kenneth A. E. Moore, chairman of McDougalls Trust, at the recent sixteenth annual ordinary general meeting. This was, he said, partly the outcome of efforts to offset rising costs by increased efficiency, and partly the result of some broadening of their activities.

Mr. Moore called for a modification in the arrangements existing between the Ministry of Agriculture and farmers so that, instead of a flat price for all home-grown wheats, quality should reap its reward in a free market, as in pre-war days.

He also suggested that the Government should consider ways and means of making it economically feasible for millers to extend their silo accommodation so that waste and deterioration of the English wheat crop might be avoided.

The maintenance of the dividend at the customary 10 per cent. was recommended.

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A satisfactory increase in turnover, both at home and overseas, had been enjoyed by the English operating company, said Mr. H. Maxwell Chalmers, chairman and managing director, when he presided over the adjourned second annual general meeting of Maconochie Foods held recently.

If the sales of their other United Kingdom subsidiary companies were taken into account, the sales of their products constituted a record.

Since July 31, 1949, there had been a very substantial increase in the turnover of the South African company, and reports indicated that since that date the company had been trading at a profit. The products of this company that had been shipped to the U.K. had met with a very favourable reception, and in the near future they would be widening the range of imports from the Union which did not compete with the production of the British factories of the company.

Annual Staff Meeting

Gifts for long service to one employee of fifty years' and three employees of thirty-five years' service were recently presented at Maidstone by Lt.-Col. Sir Cyril V. Jones, C.B.E., chairman of Foster Clark. The managing director, Mr. H. M. Beak, told employees that the greatest present need was for quality in each phase of production.

World Food News

Whaling Starts in Antarctic

The 1949-1950 whaling season, in which eighteen expeditions are participating, opened in the Antarctic in December. More modern and more numerous catcher-boats are being employed, and several of the expeditions are also using corvettes to haul the whales to the factory ships.

The combined maximum catch permitted by international agreement is still fixed at 16,000 blue whale units, and the season will continue until April 7 unless the total quota of whales is caught before that date. All the expeditions must send weekly reports of catches to the International Whaling Statistical Office in Sandefjord, Norway.

Great importance is being attached this season to the exploitation of by-products; Norway is sending a complete, up-to-date canning plant to the Antarctic to produce canned whale meat.

Sugar Research

Established to stimulate scientific studies of sugar as a food and as an industrial raw material, the $25,000 Grand Prize of the Sugar Research Foundation, Inc., will once again be given for the most significant discovery of the preceding five years. Selection will be announced by the special Advisory Committee of the National Science Fund on or about March 15.

The outlines of projects and the lists of publications given in the sixth report on the progress of the Foundation show that the search for useful facts about sugar has ranged into dentistry, pharmacy, biology, nutrition, physiology, botany, and organic chemistry. The field of interest is at present concentrated on sugar in human nutrition (with particular emphasis on the problem of tooth decay) and on the properties and characteristics of foods in which sugar is a principal ingredient.

To answer all enquiries of a non-scientific nature, a new agency, Sugar Information, Inc., has recently been established.

Norway's Free Import List

The items on Norway's extended free import list represent 52 per cent. of her imports last year from the O.E.E.C. countries. These goods, which can now be imported freely from all the O.E.E.C. countries and their overseas territories, with the exception of Belgium, Switzerland, and Western Germany, are mostly raw materials, spare parts, and some machinery. Few consumer goods are mentioned, although such items as tea, beans, and peas are included. Goods such as tyres, valves, and radio components are also on the list.

The inclusion in the list of a wide range of industrial equipment, particularly spare parts, appears to be welcomed by industry as a whole, but a number of workshops which in recent years have been making spare parts owing to the difficulty of importing them are expected to be adversely affected.

U.S. International Trade Fair

For the first time in its history, the United States is to stage an International Trade Fair to be held in Chicago from August 7 to 19. It will be housed in four different buildings totalling nearly one million square feet of space, one-third of which has been reserved for American exhibitors.

One of the main purposes of the Fair is to assist Western European countries in need of dollars to sell their goods in the United States, and a large proportion of space will accordingly be allotted to Western European exhibitors. A feature of the Fair is the formation of a European Trade Fair Board under the auspices of O.E.E.C. with M. Frederic Berbigier as Commissioner General. The aim of the Board is to co-ordinate the efforts of Western European exhibitors and to ensure that everything possible is done to give the maximum display to American buyers.

General information about the Fair can be obtained from the Exhibitions and Fairs Division of the Board of Trade.

Swiss Chocolate Industry

The Swiss chocolate market was characterised last year by a slight increase in exports and drastic cutting of imports. While Switzerland had imported 14 million francs' worth of chocolate in 1948, when domestic manufacturers were unable to meet all demands, last year's takings of foreign chocolates amounted to only one-third of that sum; demand and domestic supplies reached balance in the summer of 1949, and stocks of all well-known brands are once again ample.

Exports of chocolate rose from a value of 600,000 fr. in November to 1,200,000 fr. in the following month, bringing the total for the year to about 8,000,000 fr. This compares with shipments abroad to the value of 6,500,000 fr. in 1948. The increase in 1949 foreign sales was due largely to greater exports to Italy, France, and Germany, mainly under various aid schemes.

Synthetic Rice

Laboratory experiments for the production of synthetic rice which, when cooked, looks and tastes almost like natural rice, have been completed in the Indian Government's Food Technology Laboratory at Mysore. Further work leading to large-scale production is now in progress.

Synthetic rice is prepared from maize, barley, and other millets by two methods. In the first method, the whole grains are steeped in water containing a minute quantity of sulphur dioxide for two or three days and then ground. The fibre is then eliminated by sieving. The portion passed through the sieve is allowed to settle, the bulk of accompanying liquid being decanted.

The residue is cooked to a pasty mass and pressed through perforated discs into strands. These are partially dried in an oven at a temperature of 45° to 50° C., cut mechanically into small pieces roughly corresponding to the size of natural rice grain, and finally dried. Raw grains thus obtained resemble natural rice in appearance and may be cooked in the same way.

In the second method the paste is allowed to dry partially and become moist flour; this is then shaken for about thirty minutes in a tray with a cloth bottom until it forms into grains. These grains are heated or roasted until they are fairly hard and dry, and are finally dried in an air oven.

Norway to Aid Pakistan Fisheries

The Norwegian Government, who have been asked to assist in the development of the Pakistan fisheries, are hoping to send a biologist, a technologist (who will be a chemical engineer with knowledge of freezing, fish meal, and canning processes), and a practical fisherman to Pakistan.

Milk Products from Australia

To meet the needs of the growing export market in south-east Asia, Horlicks Proprietary, of Sydney, Australia, has started work on large-scale extensions to its plant at Nowra.

The firm, a branch of the U.K. concern, began small-scale operations at Nowra fifteen years ago; during World War II the existing plant supplied markets which could no longer be economically or easily reached by exports from the British factory.

The new plant, which will probably be completed in 1951, will include a laboratory and an experimental section. Several new products derived from milk will be produced and it is estimated that the plant will handle about 2,000,000 gallons of milk a year.

In a speech at the setting of the foundation stone, Mr. L. W. Barnett, the managing director of Horlicks Pty., said that three main factors had influenced the company in its choice of Nowra: the desirability of having a bulwark outside the United Kingdom in the event of political or economic upheaval; the inability of the present factory to cater for a growing export trade; and the use of the new plant to develop additional lines for world-wide distribution.

Bottle Labeller for Sweden

The Consulate-General at Gothenburg has received an enquiry for an automatic universal labelling machine for glass bottles from Specialmaskiner A/B, Surbrunnsgatan 6, Gothenburg, an old-established agency firm. The machine should have a capacity of 30 to 85 labels per minute with a minimum size of 20 to 24 mm. and a maximum size of 100 to 166 mm. These sizes and capacity are only approximate and the firm would be interested in any machine of comparable performance. Early delivery is essential and should not exceed six months.

Any firms interested in this enquiry are invited to send quotations with full details of delivery dates, descriptive literature, etc., direct to Specialmaskiner A/B.

Norwegian Herring Research

NEW PILOT PLANT TO BE ERECTED

Started in 1948 by a joint effort of The Herring Fishermen's Sales Organisation and The National Association of the Herring Oil and Meal Manufacturers, the Norwegian Herring Oil and Meal Industry Research Institute has recently issued its first annual report.

The Institute's premises are situated in the outskirts of Bergen; apart from the administration office, there are analytical laboratories, a biological laboratory, and a drawing office, and the foundation for a small technical library has been laid. A technical laboratory is also being fitted out, together with a section for carrying out chick-feeding experiments.

The President of the Council is the well-known industrialist, Mr. S. Bartz-Johannessen, who includes the running of two herring reduction plants in the U.K. among his many activities, while Dr. T. Sparre, for many years a resident in U.K., is managing director. At the moment the staff totals fifteen, but this number is likely to increase when the Institute's new pilot plant has been erected. This plant will carry out tests in order to secure material for scientific investigations. Experience has shown that it is impossible to rely upon tests from plants under actual operating conditions, as such conditions can never be sufficiently controlled. The pilot plant will also carry out tests on a semi-industrial scale in order to establish the fundamental principles on which present and future methods must be based.

The report mentions some of the problems already being tackled. That of stick water utilisation and the manufacture of fish solubles occupy a good deal of the Institute's attention.

The work is still in its initial stage, but a considerable amount has already been achieved; and the institute keeps in contact with other similar institutes, both in Norway and in the U.K.

Natal's Sugar Industry

PLANS TO INCREASE OUTPUT

The Natal sugar industry has recently resumed exports of sugar to the United Kingdom, and it is hoped that the present volume of exports will be substantially increased in 1950. It has been agreed that 45,000 long tons of sugar should be consigned to the U.K. in the 1949/50 milling season, and although, as a result of the recent drought, the current crop is now expected to be some 30,000 tons short of the estimate, the industry expects to be able to adhere to its present export programme.

The sugar industry has been given official encouragement to expand its production by increasing the acreage under cane and adding to the milling capacity. To this end a four-year plan has been drawn up for increasing the total output of sugar by about 25 per cent. by 1952, and orders have already been placed for most of the machinery required for this purpose.

The accuracy of estimated future acreage and production figures will depend largely on weather conditions and other factors, but it is reasonably safe to assume that the South African sugar crop in 1950/51 will be between 670,000 and 720,000 tons, and in the following year between 720,000 and 780,000 tons. The crop in 1948/49 was 607,845 tons.

The Government is trying to persuade the industry to erect a new sugar mill with a capacity of 45,000 tons at Pongola, whence it is proposed to transport the sugar by road to Piet Retief; but the industry is understood to regard the scheme as uneconomic.

The position regarding the granting of import licences for sugar machinery has recently been clarified, and there is no longer any doubt that permits will be granted for all essential items of sugar machinery required for the expansion of the industry provided that delivery dates are adhered to, and that the items are included on the schedules of machinery requirements which have recently been compiled. Soon after import control was imposed on all goods entering the Union, a panel of sugar millers and cane growers was formed to submit the sugar industry's case to the import control authorities. This panel screened all applications from the industry for imported equipment, working at the request of the Department of Commerce and Industries on the principle that:

(*a*) Nothing should be imported from overseas which could be manufactured in the Union;

(*b*) preference should be given to sterling over non-sterling imports wherever possible;

(*c*) nothing should be imported in the immediate future if its arrival could be delayed for some time without causing undue inconvenience.

The panel then submitted schedules of its essential requirements to the import control authorities.

The Director of Imports and Exports has already granted permits for all items on the schedule for the period ending December 31, 1949, and has given a definite assurance that permits will be granted covering all subsequent scheduled requirements. In this connexion the following points are emphasised:

(*a*) It is very important that United Kingdom manufacturers should take all possible steps to adhere to promised delivery dates, because permits for goods due to arrive in one half-year period will not necessarily be extended to a subsequent period if the goods are not exported to the Union during the validity of the permit.

(*b*) If any equipment is ready for shipment before the scheduled delivery date the relevant import permits will not normally be granted until the beginning of the half-year period during which delivery was originally promised.

Plastic Pouring Device

Particularly suitable for canned juices, milk, salad oils, and syrup, a plastic device known as the Aladdin Canmaster has been produced by the Consolidated Moulded Products Corporation, of Scranton, Pa., to facilitate pouring from cans. Held between the fingers, the device is pressed into the can top and given a half twist; when the can is tipped to a pouring angle, the contents flow easily from the container. Unused contents can be stored for a reasonable time in a refrigerator with the device still affixed.

German Industries Fair

Organised and managed by a committee consisting entirely of German members, the German Industries Fair is to be held once again at Hanover. From March 29 until April 2 the Fair is to be devoted to the light industries; heavy industries will be featured from May 8 to 14.

Cheese in All Shapes

A new Dutch cheese product, which can assume various shapes and may even be compressed into tablets or lozenges, will soon be available in foreign markets. It will be produced by the Vica Cheese Factory, which was recently established at Soest, in the Province of Utrecht.

Mainly designed for export, the new product has a high calorie value, and will keep well in tropical and polar regions.

U.K. Foodstuffs Wanted

The United Kingdom Trade Commissioner in Montreal reports that the International Food Distributors' Corporation, 2207, Dandurand Street, Montreal, 36, are interested in distributing U.K. foodstuffs and confectionery items.

The firm are distributors, wholesalers, and brokers of food products and allied grocers' sundries, selling to both wholesalers and retailers. They have distributors in Vancouver, Winnipeg, and Toronto with staffs of salesmen, and their organisation covers the whole of Canada.

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The British Consulate, Denver, Colorado, reports that Mr. Bennett Needler of 880, Krameria Street, Denver, Colorado, wishes to import chocolate-coated biscuits and confectionery items of United Kingdom manufacture.

Any firms who are interested in this enquiry are invited to communicate direct with Mr. Needler, quoting c.i.f. prices in U.S.A. currency.

Italian Food in 1949

ECONOMIC ASPECT HAMPERS RECOVERY

During 1949 the food industries in Italy continued their return to normalcy, but, owing to the drop in prices of finished products caused by the abundance of raw materials, and the consequences of currency depreciation, the results from the economic point of view have not equalled those for 1948.

Flour and Macaroni

Steps have already been taken towards freeing the milling and macaroni industries from all restrictions, but for the moment complete freedom cannot be introduced. The potentiality of flour mills totals some 10 million tons a year and there will soon be no necessity for pooling.

Macaroni factories are faced with the need for recapturing export markets since their output capacity greatly exceeds the amount that Italy can absorb.

Fruit and Vegetables

Figures for the output of tomato products show considerable improvement on those for 1948; home consumption is stationary, but exports suffered a setback owing to currency depreciation in the sterling area. The prices of tomato preserves have not differed from those for 1948 and cost of strips for cans continues to form a heavy item in the total cost of the products.

The jam and fruit preserves situation is critical and not likely to improve until the price of sugar for industrial uses is reduced.

Meat Preserves

Favoured by the increase of the livestock in the country (especially pigs), meat preserve factories have greatly improved output, but the industry is still faced with difficulties, the chief of which is the low price of pigs.

Exports of meat products have been reasonably good and the increased demand of the home and foreign markets has favourably influenced canned meat production.

Sugar and Confectionery

The sugar industry has definitely returned to normal; a yield of some 445,000 tons of sugar is expected in addition to some 13,000 tons obtained by baritation process from molasses.

Although the confectionery industry can now obtain all supplies required, the pre-war output of 90,000 tons has not yet been reached owing to marketing difficulties. Competition is strong and the pressure of imported products at lower prices is felt greatly. Attempts at exporting have not been successful; only the exports of candied fruit to England and Canada have recently shown some improvement.

Milk and Cheese Products

The output of dairy products in 1949 exceeded the pre-war level, but was not accompanied by a proportionate increase in exports, although the figure is on the increase.

Exports of condensed and powdered milk to Germany and Egypt have revived while good contracts for gorgonzola and various soft cheeses have come from England, and promising negotiations are being conducted with Germany. The production of all the pre-war types of cheese has been resumed and manufacturers are competing for quality products.

Oil Output

The 1949 output of oil was only slightly greater than in 1948. Keeping down prices by means of exports resulted in a decline in wholesale prices without a corresponding reduction in prices to consumers, and a number of oil mills have closed down as a result.

The lower output of oleaginous seeds is also ascribed to excessive imports which rendered local production uneconomic.

U.S. Plastics Exposition

Producers and users of plastics from other countries, including the United Kingdom, have been invited to take part in America's Fourth National Plastics Exposition.

Sponsored by the Society of the Plastic Industry, Inc., the exposition will be held at the Navy Pier, Chicago, Illinois, from March 28 to 31, and manufacturers of moulding, extending, and laminating machinery as well as materials suppliers will be participating.

The object of the Exposition is to tell the story of plastics and reveal their potentialities for the improvement of consumer products and the development of new markets.

Sugar Machinery for S. America

The First Secretary (Commercial) at Caracas has cabled the Commercial Relations and Exports Department of the Board of Trade that the Corporacion Venezolana De Fomento, Esquina De Santa Capilla, Caracas, have invited manufacturers of sugar mill machinery to register with the Corporation's sugar industry department.

Tenders will be invited from firms selected from among those registering for a 600 ton sugar mill at Motatan.

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The First Secretary (Commercial) at the British Embassy, La Paz, has been approached by Senor Alfonso Burry, Casilla 15, Tarija, Bolivia, regarding his desire to contact United Kingdom manufacturers of sugar refining machinery.

The machinery needed at present would be a simple installation for the production of crude commercial sugar with a capacity for grinding approximately 50 tons of sugar cane of 11 to 12 degrees in 12 hours, or the production of from 3½ to 4 tons of crude pulverised sugar per day for general consumption. An installation of this type should comprise a sugar mill, one or two centrifuges with their mixers, the pans or sugar evaporators for boiling the cane juice, and such auxiliary machines as would be deemed necessary. The plant would be run by a Diesel motor pending the construction of a hydraulic plant.

Senor Burry is also interested in small sugar mills, worked by motor, with a capacity for grinding 1-2 tons of cane per 12 hours, for the purpose of selling pure cane juice directly to the public.

Interested United Kingdom manufacturers are invited to communicate direct with Senor Burry, submitting catalogues, prices, and details of delivery.

The First Secretary states that there are indications of an early development in the Bolivian sugar growing industry, with consequent demand for machinery. In general, it is thought, the demand will be for a smaller type of hand-operated press. In this connexion, the firm of Johansson y Cia, Casilla 678, La Paz, has indicated to the First Secretary its interest in small sugar cane presses, and United Kingdom manufacturers may care to communicate with this firm direct.

It would be appreciated if offers and correspondence could be conducted in the Spanish language.

News from the Ministries

Vegetable Drying Decontrolled

The Drying of Vegetables (Licensing and Control) Revocation Order, 1949, which came into force on January 8, has been made to give effect to the decision to free the drying of vegetables from licensing restrictions.

Director of Tea

Mr. Cecil F. Cumberlege, who has been appointed Director of Tea in succession to the late Mr. Henry Jones, is senior partner of Thomas, Cumberlege and Inskipp, tea brokers, and was recently elected President of the Tea Brokers' Association.

Canadian Cheese

An agreement has been concluded with the Canadian Government for the purchase of cheese in 1950. The agreement provides for the shipment to the United Kingdom of a maximum quantity of 85 million lb. of cheese and a minimum quantity of 70 million lb. at a price of 25 cents per lb. f.a.s. Canadian seaboard.

The purchase is part of the current U.K. import programme and should enable the present ration to be maintained for some time to come.

The 1949 contract for cheese provided for the supply to the United Kingdom of 50 million lb. at a price of 31 cents per lb. f.o.b. Montreal.

Control of Fancy Cheese

From March 1, the Ministry of Food will cease to import the following varieties of fancy cheese:

Gorgonzola cheese imported from Italy and Denmark.

Other blue vein cheese imported from Denmark, Sweden, and Hungary.

Italian full cream soft cheese (*i.e.* Bel Paese, Pastorella, Cacio Reale, Bich, Fior d'Alpe, Stella Alpina, Grasso di Melzo, and Montanara).

St. Paulin cheese imported from France.

Emmenthal cheese imported from Switzerland.

Ample supplies of these cheeses are available and their importation by private traders will be permitted from March 1.

From the same date, price control will be removed from these cheeses. The Cheese (Control and Maximum Prices) Order will be amended accordingly.

Unsweetened Fruit Pulp

Supplies of fruit pulp (unsweetened) can now be made available to manufacturers of products other than jam. The varieties are:

Strawberry (plugged); raspberry; blackcurrant (strigged or sieved); gooseberry; red currant (strigged or on-stalk); cherry (pitted); greengage (with stones); apricot; bitter orange; grapefruit.

With the exception of apricot and a small quantity of raspberry and blackcurrant, the pulps are packed in barrels and preserved with sulphur dioxide.

Enquiries, whether from agents or manufacturers, concerning quantities, prices, etc., should be addressed to the Ministry of Food, Fresh Fruit and Vegetables Division, Fruit Pulp Branch, Carlton Hotel, Pall Mall, London, S.W.1.

Sale of Food by Weight

Under the Sale of Food (Weights and Measures; variation of First Schedule) Regulations, 1949, which come into effect on August 1 this year, certain foodstuffs have been added to the list of foods which must be sold by net weight, or, if sold by gross weight, the weight of the wrapper or container is not permitted to exceed small stated amounts.

When the foods are prepacked before they reach the shops, they will have to be made up in certain fixed quantities. The wrappers will also be required to bear a true statement of the minimum weight of the contents or of the contents plus the weight of the wrapper.

The following foods are affected by the new regulations: compound cooking fats, flavoured and coloured semolina, macaroni and similar products or substitutes, and soya flour. Also included are dates, prunes, figs, muscatels, apples (including dried apple rings), pears (including dried pear rings), peaches, apricots, and nectarines.

Dripping Allocations

Trade users of dripping are now free to buy their authorised allocations of dripping from more than one wholesaler or manufacturer.

Previously, trade users were given one permit covering their total allocation. They will now receive an appropriate number of unit permits—of the coupon type—to the value of their allocations. These unit permits will be issued by the Oils and Fats Distribution Officers to trade users against an established datum.

After filling in his name and address, the trade user must pass his permits to his chosen supplier or suppliers. Wholesalers will then pass the permits to manufacturers who will deliver dripping to the quantity authorised by the permit.

New Prices for Flour Confectionery

CAKE QUALITY TO BE IMPROVED

The Flour Confectionery (Control and Maximum Prices) Order, 1946, has been further amended to provide a new maximum price structure for flour confectionery.

The maximum price is now 1s. 9d. per lb., but where the combined content of fat, sugar, and dry egg solids (or any two of them) amounts to 45 per cent. or more, or where for every pound of cake the ingredients cost 10d. or more, the maximum price is 3s. per lb.

In addition, a charge is now allowed for packing cakes in a cardboard carton or box, provided the charge does not exceed the reasonable and actual cost of the container. The Order provides for a maximum charge for packing of 1½d. for the first lb. or part of a lb. of flour confectionery, 3d. where the flour confectionery weighs more than 1 lb. but not more than 2 lb., and 4d. where the flour confectionery weighs more than 2 lb.

The new price structure is designed principally to enable bakers to improve the quality and variety of their cakes. The prices of existing varieties are not likely to be affected materially, but recent increases in the price of some ingredients may cause slight rises.

Bakers are reminded that it will be a contravention of the Order to charge more than 3s. per lb. (plus the permitted addition for packing where appropriate) for any kind of flour confectionery unless an individual licence has been obtained from the Food Office. Such licences will be given only for wedding and christening cakes.

Board of Trade Reorganisation

NUMBER OF DIVISIONS REDUCED

In order to reduce the number of Divisions in the Board with which a single industry or firm has to deal, the Home Side of the Board of Trade was reorganised on January 16. The work on each raw material is now being put (as far as possible) in the same Division as the work on the industries which consume that raw material.

This means that the Raw Materials Department and Priorities Division will disappear as separate entities and their functions will be merged in the industrial work of the Industries and Manufactures Divisions. There will now be four of these Divisions concerned with particular industries.

At the same time the general work of the "Home" Departments of the Board of Trade not related to particular industries will be concentrated in three Divisions to be known collectively as Industries and Manufactures I. The work of these three Divisions will be arranged as follows:

Division IM1A: All price control; restrictive practices; retail trade distributions; consumer needs.

Division IM1B: Import policy and import licensing (with Import Licensing Branch); United Kingdom tariffs and Key Industry Duties.

Division IM1C: Investment and general industrial policy; industrial building; weights and measures (with Standards Branch).

This reorganisation will not affect the Distribution of Industry and Regional Division, the Divisions dealing with Insurance, Companies and Bankruptcy, the Patent Office, or the Administration of Enemy Property Department.

Fish Distribution Office Closes

The Port and Area Fish Distribution Office, Ocean View, Battery Green Road, Lowestoft, closed down on February 4, 1950.

The Port Fish Agent's Office at the same address is remaining open for the time being and will continue to deal with any matters connected with the Fish Transport Scheme.

All other official enquiries concerning fish control at the ports should now be addressed to the Ministry of Food, Fish Division, Carlton Hotel, Pall Mall, London, S.W.1.

Imported Blue Vein Cheese

The Cheese (Control and Maximum Prices) Order, 1948, has been further amended with the following effects:

1. From January 29, Roquefort cheese imported from France is freed from price control and importation of this cheese by private traders is now permitted.

2. From the same date the maximum prices of imported blue vein cheese (other than Roquefort) are reduced as indicated:

	On a sale by wholesale (per cwt.)	
	From	*To*
	s. d.	*s. d.*
Italian Gorgonzola	387 4	354 8
Other imported blue vein cheese	387 4	317 4

Import of Rapeseed

Arrangements have been made to permit limited imports of rapeseed and rapeseed oil from Argentina under individual licence.

Applications for import licences should be made on Board of Trade form ILD/A obtainable from the Import Licensing Department, Board of Trade, Romney House, Tufton Street, London, S.W.1. For administrative convenience the application should be sent in the first instance to the Oils and Fats Division, Ministry of Food, London Road, Stanmore, Middlesex.

Alteration in Millers' Grists

Grists for making bread in England and Wales were altered on February 6 to:

65 per cent. Manitoba wheat (maximum).

15 per cent. home-grown wheat (minimum).

10 per cent. Australian wheat (maximum).

10 per cent. filler wheats, as available.

There is no restriction on the use of Australian or home-grown wheat in grists for purposes other than breadmaking.

In Scotland a maximum of 70 per cent. Manitoba wheat may now be used in the springs grist.

No alteration has been made in the grists for Northern Ireland.

Resignation

Sir William Rook has relinquished the post of Director of Sugar as from January 31, 1950. He has expressed his willingness, however, to continue to render any assistance possible in an advisory capacity.

Chocolate Imports

The following additions have been made to the list of countries from which chocolate and sugar confectionery and cocoa products may be imported under the block licensing arrangements:

Sweden—Chocolate confectionery and chocolate couverture.

Austria—Chocolate confectionery, sugar confectionery, and chocolate couverture.

No alteration is necessary to block licences already held by importers. All enquiries should be addressed to the Cocoa, Chocolate, and Sugar Confectionery Division, Ministry of Food, London Road, Stanmore.

Grant of Open General Licence

Notice to Importers No. 353, issued by the Import Licensing Department, gives details of the grant of open general licence and amendments to previous open general licence. The notice says that in accordance with the statements as to the policy of import relaxations made by the President in the House of Commons on September 29, and December 15, 1949, the Board of Trade announce that a further open general licence has been issued for the import of the goods which are consigned from and originate in any country or territory other than:

Albania, Argentina, Belgium, Belgian Congo, Bolivia, Bulgaria, Canada, Columbia, Costa Rica, Cuba, Czechoslovakia, Dominican Republic, Ecuador, El Salvador, French Somaliland, Germany (Russian Zone), Germany (Western), Guatemala, Haiti, Honduras, Hungary, Iran, Japan, Liberia, Luxembourg, Mexico, Nicaragua, Panama, Philippines, Poland, Rumania, Switzerland, Tangier, Uruguay, United States of America, Union of Soviet Socialist Republics, Venezuela, and Yugoslavia.

This open general licence came into force on January 25, 1950. Accordingly, as from that date, individual licences will not be required for the import of these goods.

A schedule is attached detailing, under Group 1, Parts A and B, the articles of food, drink, and animal feedingstuffs involved.

Information and Advice

Faults in Marmalade Manufacture

B.3935. *Some of our marmalade has gone sugary after it has been opened by the consumer. Perhaps you can advise us in this matter.* (Essex.)

The fault lies in the balance of sugars. Expertly boiled jam or marmalade should be balanced on a basis of approximately 45 parts of invert sugar to 55 parts of sucrose. Assuming that the total sugars of the marmalade amount to 70 per cent., the invert sugar should not be above 35 per cent. and not below 30 per cent. The excessive sucrose content causes crystallisation, while excessive invert sugar results in granulation. The phenomenon you have observed is quite typical for wrongly balanced sugars, and we would advise you to ascertain immediately the correct proportion of reducible and irreducible sugars. You can do this yourselves or obtain the assistance of a chemist.

If you should find excessive invert sugar, you will have to reduce the boiling time, cool more efficiently, and, most important of all, add the citric acid after the marmalade has been discharged. Acid content, boiling temperature, and boiling time govern the inversion of sugar. In the case of an excessive proportion of sucrose, it will be necessary to pre-invert part of the sucrose, and use a proportion of invert sugar with each boil. The latter method is practised in many factories.

"Weeping" of Synthetic Cream

B.3994. *We have received complaints that synthetic cream is "weeping" in the piping bags. How can we rectify this fault?* (Scotland.)

Probably the chief reason why the water separates from the fat when the cream is used is that there is not sufficient fat in the emulsion. There should be about 35 to 39 per cent. fat in the finished cream to give it sufficient body and food value when it is used.

A little milk powder, about 10 per cent., would also help to give the cream some stability. An agar solution, using 2 oz. per 3 pints water, is probably one of the best stabilisers when used at the rate of 10 per cent. of the finished cream. Other stabilisers may be used with good results, but only when there is sufficient fat present in the cream and it has been thoroughly emulsified.

Easter Eggs

B.4051. *I would be much obliged if you would give me details of the technique of Easter Egg making with information on the type of chocolate, melting temperature, tempering, etc.* (Ireland.)

The chocolate usually used in Easter Egg production is a moulding chocolate which contains less cacao butter than the coating variety and is not so highly refined. This low-fat chocolate clings better to the egg moulds for obvious reasons.

The chocolate, whether purchased or produced, is broken up and placed in a steam-water-jacketed kettle. While being treated, the chocolate mass must be constantly but slowly stirred. The melting temperature may be 140° F. When completely melted, the temperature is reduced to 95° F. and maintained at this level while the chocolate is drawn off for tempering.

The tempering is usually carried out in another chocolate kettle. The temperature of the chocolate is brought down to 86° F., then carefully raised to 89° F. At this point it is ready for filling into the metal egg moulds.

The egg moulds should have a temperature of at least 79° F. before being charged with tempered chocolate otherwise moulding will be difficult.

To fill the moulds, each half of the latter is charged with the required amount of chocolate (according to cost but of sufficient bulk to stand handling), the two halves are clipped together, and the unit placed in the spring clips of the whirling machine, which causes the chocolate to spread evenly over the inner surface of the complete mould. This takes a matter of minutes.

The complete moulds are passed through a cooling unit and then de-moulded. The eggs should be handled carefully to prevent marking.

Information Supplied

The Enquiry Service has dealt with requests for the names of manufacturers and suppliers of plant, machinery, and materials, also general information as follows:

B.3961. *Plucking poultry by wax.* (Scotland.)
B.3963. *Canning machinery.* (Lancs.)
B.3964. *Tea packing machinery.* (Ireland.)
B.3968. *Marzipan.* (Northumberland.)
B.3969. *Norit.* (British West Indies.)
B.3972. *Spray guns.* (Northumberland.)
B.3974. *Pickled onions.* (Wales.)
B.3976. *Hazel nuts.* (London.)
B.3978. *Tomato paste.* (Mont.)
B.3980. *Chellies.* (London.)
B.3982. *Infusorial silica.* (Germany.)
B.3984. *Apple pectin.* (London.)
B.3985. *Glucose and sugar fondant mixing machine.* (London.)
B.3986. *Roasted filberts.* (London.)
B.3987. *Filling honey into jars.* (Glos.)
B.3989. *Barley grain counting.* (Yorks.)
B.3990. *Alcoholic ginger wine.* (London.)
B.3991. *Electric water feed pumps.* (Scotland.)
B.3992. *Drinking straws and requisite paper.* (S. Rhodesia.)
B.3993. *Electric hog stunning machine.* (Canada.)
B.4000. *Peanut machinery.* (Ireland.)
B.4002. *Bottling of fruits.* (Ceylon.)
B.4007. *Tinned Christmas pudding production.* (Ireland.)
B.4009. *All-purpose cotton bags.* (London.)
B.4010. *Filling equipment.* (Hants.)
B.4012. *Protective material for lining tanks.* (Worcs.)

Information Required

B.4041. *Name and address of suppliers of a good coconut substitute.* (Lancs.)
B.4088. *Name and address of suppliers of nut cracking plant, or any firms undertaking the cracking of nuts for outside orders.* (London.)

Recent Patents

632,352. FREARS AND BLACKS, LTD., and FREARS, J. N.: Manufacture of bread and like cereal products.
632,399. BAKER PERKINS, LTD., and PALMER, A. R.: Delivering dough pieces to baking tins or making bread.
632,517. CARTER, C. F.: Machines for filling containers.
632,756. FIREPROOF TANKS, LTD., and LOCKE, W. F.: Mounting of fittings on flexible containers for liquids.
632,951. JOSEPH, B. C.: Lids of coffee percolators or the like.
632,973. CARTER, C. F.: Heads for container filling machines.
632,988. SHUTTLEWORTH AND CO., LTD., W. S., STANCLIFFE, G. B., and THOMAS, A.: Manufacture of chocolate in divided form.

Abstract of a Recent Specification

Preparation of Soluble Coffee Powder

In the known methods for the preparation of soluble coffee extracts in pulverulent form, the roasting of the beans precedes all other operations. In one known method the beans, after roasting, are subjected to an infusion, the juices of which are afterwards treated in a concentrating or distilling apparatus, with collection of the aromatic products distilled during the course of the operation. The concentrated juices are evaporated to the dry state in drying apparatus by atomisation, with or without the addition of carbohydrates, while the aromatic products, extracted by means of suitable solvents, are finally reincorporated in the soluble coffee powder.

The preliminary roasting, if conducted at a suitable point, has the effect of developing to a maximum the formation of the aromatic constituents, but the collection of these latter, by reason of their weak vapour pressure, represents a delicate operation, which complicates the infusion, concentration, and drying phases and gives rise to more or less appreciable losses.

The present invention eliminates all these disadvantages by bringing about the development of the aromatic products only in the latter phase of the treatment.

The invention relates, therefore, to a method and apparatus for the preparation of soluble coffee powder, whereby the soluble constituents are extracted by treating the coffee in the green condition, that is to say unroasted, but ground, this latter for the purpose of augmenting the rapidity of extraction.

The operation is conducted, in principle, in two successive phases:

1. Separation of the fatty aromatic products by means of a suitable solvent.

2. Infusion, by means of water or vapour, of the remaining soluble elements.

After elimination and recovery of the solvent by distillation the aromatic products extracted in the form of oils are incorporated with the juices of diffusion, and the whole is evaporated to the dry state by treatment in a concentrator and finally by means of atomisation.

The soluble extracts are thus obtained in the form of a green-coloured powder, reminiscent of the colour of the original coffee. This powder is afterwards heated in a drying apparatus, and during the course of this heating to the necessary temperature and for the necessary period the soluble extracts are modified by giving rise to aromatic and tonic constituents in a manner similar to that which takes place in the roasting of green coffee. In the course of this heating the powder becomes brown and assumes to a very appreciable degree the colour of roast coffee. A surprising effect of the invention consists in the fact that the soluble extract of the green coffee remains soluble after torrefaction, and by dissolution in water the roasted soluble extract enables a beverage to be obtained which is comparable with an infusion of coffee prepared according to household methods.

630,153. *Appareils et Evaporateurs Kestner.*

Recent patents have been selected from the "Official Journal of Patents" and are published by permission of the Controller of H.M.S.O.

Trade Marks

TENDROL. — 668,538. Liquid compounds of chemicals, herbs, and common salt for use in making meat, poultry, and game tender. **Campbell D'Arcy, Limited,** 92, Fulham Road, London, S.W.3; Manufacturers and Merchants.

MERCURY.—669,397. Meat preparations and fish preparations, all for food for human consumption; and canned meats, canned fish, canned poultry, canned vegetables, canned dripping (for food), butter, cheese, vegetable preserves, milk and milk products (for food). **H. C. Sleigh, Limited** (a Company duly incorporated under the laws of the State of Victoria, Commonwealth of Australia), 582-584, Little Collins Street, Melbourne, State of Victoria, Australia; Manufacturers and Merchants.

CORONET.—671,033. Tea, coffee, cocoa, coffee beans, and cocoa beans; preparations for making coffee, tea, cocoa, and drinking chocolate; and preparations for making food beverages in which malt predominates. **Thomas and Evans, Limited,** 24, Hannah Street, Porth, Glamorganshire; Manufacturers and Merchants.

MAJESTIC. — 678,685. Non-medicated confectionery (other than flour confectionery). **Watson's Toffee Works, Limited,** Pyne Confectionery Works, Union Road, Byker, Newcastle-on-Tyne; Manufacturing Confectioners.

GLENZYME.—678,713. Yeast for food for human use. **Norman Carter, Leslie Herbert Carter, Frank Benjamin Carter,** and **Marjorie Belle Robinson,** trading as **Carter Bros.,** Glen Laboratories, Otley Road, Shipley, Yorkshire; Manufacturing Chemists.

GREED.—679,142. Preparations consisting principally of sauce, honey, chocolate, treacle, or golden syrup, for use in spreading on foodstuffs. **Holbrooks, Limited,** 203, Ashted Row, Birmingham; Cheapside, Stourport, Worcestershire; and 68, Fenchurch Street, London, E.C.3; Sauce and Pickle Manufacturers.

ICERENA.—679,163. Essences, flavourings (other than essential oils), baking powder, cereal preparations for food for human use, preparations for use in the manufacture of ices, invert sugar, vinegar, sauces, and spices. **Cumming, Parsons, Limited,** St. Mary's Distillery, St. Mary's Street, Manchester, 9; Manufacturing Chemists.

Trade marks have been selected from the "Official Trade Marks Journal" and are published by permission of the Controller of H.M.S.O.

New Companies

A. R. Lester, Limited. (475070.) 38, Queen Street, Scarborough. To take over the business of wholesale bakers and confectioners carried on as "Elsie Coyne" at 1 and 2, Castle Place, Scarborough. Nom. cap.: £1,000 in £1 shares. Dirs.: R. W. Walker and Mrs. D. Walker, Parades Café, Sandside, Scarborough; A. R. Lester and Mrs. M. D. Lester, 1-2, Castle Place, Scarborough.

Payford Food Products, Limited. (475101.) 17, Dunstable Road, Luton. Nom. cap.: £2,500 in £1 shares. Dirs.: R. Hopkins, 14, Westlecote Gardens, Luton; E. Payne, 581, Dunstable Road, Luton; J. H. Stanford, I. G. Whales, and J. P Woodfield.

M.G. Potato Crisp Company, Limited. (476520.) 212-216, Oxford Street, Sheffield. To take over business carried on as "The M.G. Potato Crisp Co." by Jules M. Gardiol and Ernest Friend. Nom. cap.: £5,000 in £1 shares. Permt. dirs.: E. Friend, 189, Rustlings Road, Sheffield; J. M. Gardiol, 3, Reservoir Road, Sheffield.

Shenstone Mills, Limited. (476534.) The Mill, Shenstone, Staffs. To take over business of a corn merchant and miller carried on by Wm. H. Thomason as "W. H. Thomason" at Shenstone, Staffs. Nom. cap.: £20,000 in £1 shares (5,000 cum. pref.). Dirs.: E. R. Durose (Permt.) and R. W. Durose, Mill House, Alrewas, nr. Burton-on-Trent.

Carmel Exporters (London), Limited. (476559.) To carry on business of dealers in and importers and exporters of tea, coffee, cocoa, provisions and similar goods, etc. Nom. cap.: £10,000 in £1 shares. Dirs.: not named. Subs.: T. E. Roberts (clk.) and Kathleen A. Dixon (secy.), 317, High Holborn, W.C.1.

Fincham Matson and Company, Limited. (476615.) Friars House, Rangoon Street, E.C.3. To carry on business of planters, cultivators, importers, exporters, blenders, and distributors of tea, coffee, cocoa, rubber, general merchants and dealers, etc. Nom. cap.: £2,000 in £1 shares. Dirs.: to be appointed by subs. Subs.: O. R. Carson (secy.) and W. E. Thomas (dir.).

Collins Crisps, Limited. (476616.) Foxoak Street, Cradley Heath, Staffs. To carry on business of manufacturers of and dealers in potato crisps, etc. Nom. cap.: £100 in £1 shares. Dirs.: Marion G. Collins and I. Collins, junr., The Tiled House, Romsley, Worcs.

Fruiterers (Peterborough), Limited. (476618.) 30, Midgate, Peterborough. Nom. cap.: £2,000 in £1 shares. Dirs.: Mrs. L. Woodcock and P. T. Tyler, 73B, London Road, Peterborough.

G. Brazil and Company, Limited. (476619.) Beechy Bucks Factory, London Road, Amersham, Bucks. To carry on business of wholesale provision factors, sausage and pie manufacturers, etc. Nom. cap.: £50,000 in £1 shares. Permt. dirs.: G. F. Brazil, Affricks Farm, Little Kingshill, Great Missenden; R. Brazil and J. Brazil, Town Mill, Amersham.

Mack's (Butchers), Limited. (476643.) 196, High Street, Bromley, Kent. Nom. cap.: £500 in £1 shares. Dirs.: C. L. McPherson and Bessie McPherson, 9, Muschamp Road, S.E.15.

Taken from the Daily Register, compiled by Jordan and Sons, Limited, Company Registration Agents, 116, Chancery Lane, London, W.C.2.